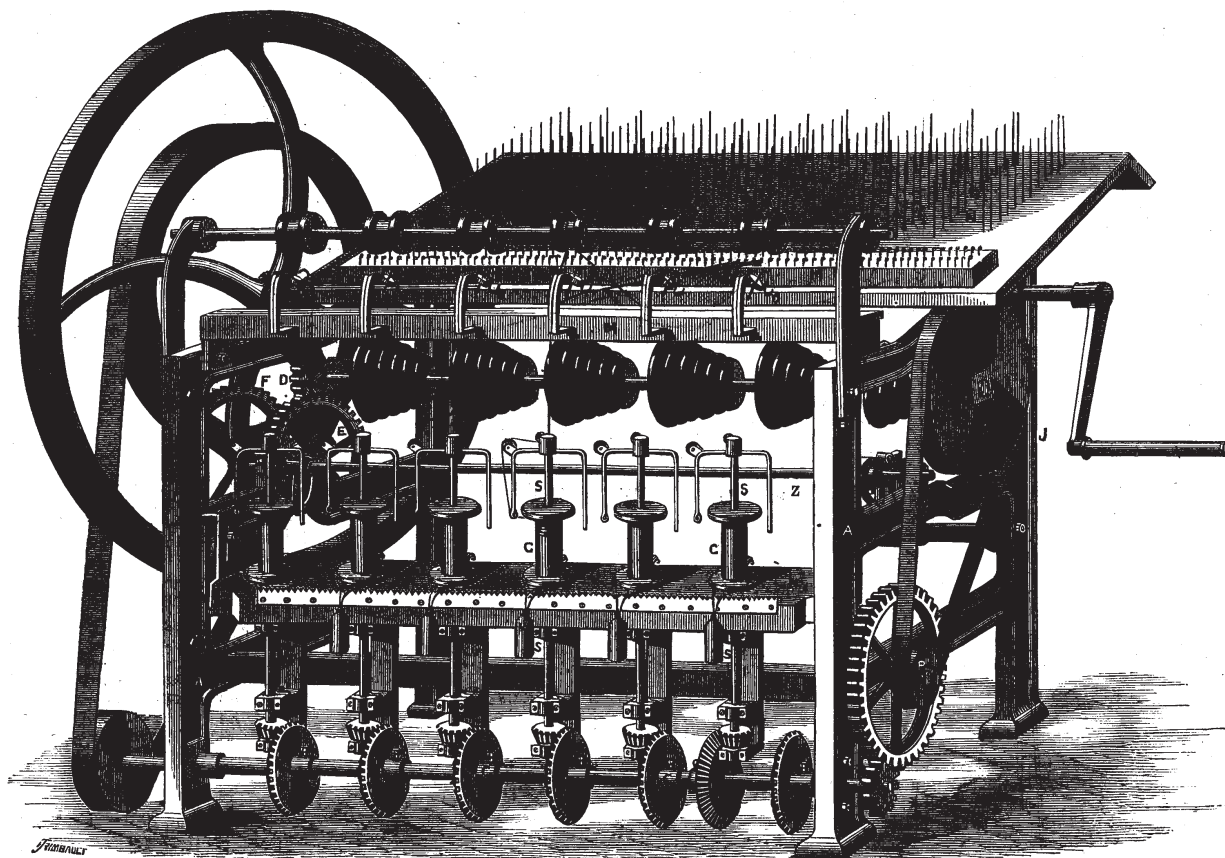

COVERING AND TWISTING MACHINE, AT THE VIENNA EXHIBITION.

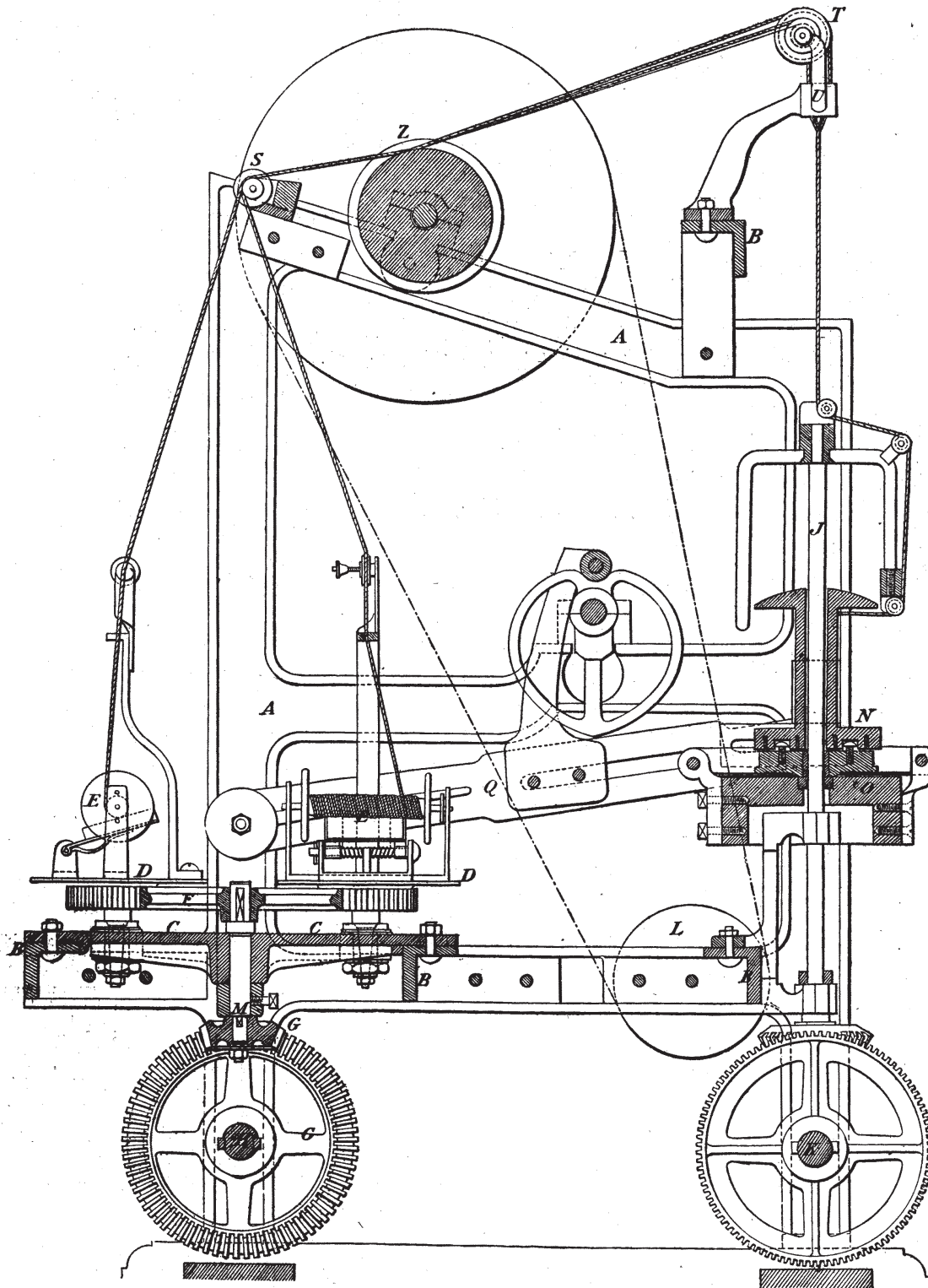
CONSTRUCTED BY MR. G. STEIN, ENGINEER, BERLIN.

(For Description, see Page 360.)



CORD-MAKING MACHINE, AT THE VIENNA EXHIBITION.

CONSTRUCTED BY MR. G. STEIN, ENGINEER, BERLIN.



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

By DR. H. GROTHE.

The machines for fringe-making at the Vienna Exhibition, represent multifarious constructions intended to fulfil the varied requirements of this branch of industry. Amongst these machines we find examples for making all kinds of cords,

gimps, and trimmings, &c., some of these being entirely new and of highly interesting construction. Amongst these we may first mention the beautiful braiding machines for the manufacture of narrow bordered ribbons, of many threaded cords, of lace, gimps, &c. These little braiding machines are constructed generally in such a manner, that vertical bobbin holders, to which bobbins are fastened, are made to travel over ways

cut into thin iron plates, the motion being produced by a series of toothed wheels, the teeth of which gear into the well turned body of the bobbin holders fastened under the plate, the bobbins being thus moved along the fixed ways. The ways and curves in which the bobbin holders are moved follow from the points of intersection. The moving of the bobbin holders producing considerable friction, and especially a pressure of the holders against the edges

of the curves, various constructions have been tried, without removing entirely these disadvantages. For the French machines of this class, wooden wheels are generally used, whilst the manufacturers of Bannan (the principal seat for the manufacture of these machines in Germany), have adopted finely cut iron wheels; in place of these, however, wheels of hard caoutchouc are at present being tried, as proposed by the present writer. Other manufacturers combine iron and wood, and a few Austrian manufacturers brass and wood, for this gearing.

Such braiding machines are exhibited in the Austrian and Swiss departments. To the latter belong the braiding machines of Mr. Friedrich Diebold, of Baden. They are provided with wooden wheels, are well executed, and work well, although there is nothing especially new in their construction. The same may be said of the machine exhibited by Mr. Anton Demuth, of Vienna. In general, however, little attention is paid to improvements in the construction of these machines, and nothing has ever been written or published about them, and still large manufactories are filled with them, and they produce some of the prettiest work turned out by textile industry.

Cords which require less care in their manufacture, and which are made in larger quantities, are produced on larger machines, an excellently designed example of which is exhibited by Mr. G. Stein, of Berlin, whose works have existed since 1827, when they were started and carried on until 1856 under the name of Fr. Haack. At these works only machines for fringe making are built, and nearly all the makers of fringe in North and South Germany, and in Russia, have been supplied with machines by Mr. Stein, who has gained a great name by the perfection of such machines. In the case of the machinery for making cord, shown at the Vienna Exhibition, and an illustration of which we publish on the preceding page, Mr. Stein has made a new progress in this manufacture, for up to now cords of two, three, or four threads had to be always made with the ordinary hand wheel—a mode of working which is much too expensive and inconvenient for the present state of industry. Our engraving shows this machine with all its details, and for the sake of clearness the bobbin table and bobbin are shown in section.

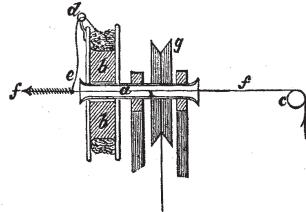
Two iron frames A, connected by cross pieces B, carry upon the horizontal fixed table C four carriers, which are fastened upon plates D, and in which the rolls E for the roving thread are placed. The plates D are fixed upon the table C by means of pins, which carry pinions gearing into a spur wheel F, this latter being driven from the shaft H by the bevel wheels G and G'. A suitably arranged contrivance above the rollers E secures for the cord the proper tension. At the opposite side to these rollers is placed a strong throwing spindle J, which is also moved by a horizontal shaft K and a pair of bevel wheels. The spindle J turns in a direction opposite to that in which the plates D rotate. At the top of the frames the winding drum Z is placed, the speed of this drum being capable of being altered by fixing pulleys of different sizes at L, whilst the speed of the plates D may be regulated by altering the wheels at M. In this manner it is possible to alter both the motions just mentioned, but independently of each other. The carriage O, moved up and down by the lever, is used for winding the cord on the bobbin N. The course of the threads for the cord is shown on the engraving. If cords have to be made, the threads coming from the rollers E are passed over the roller S, then entirely round the drum Z, and from thence over the roller T, through the guide U, which keeps the single threads always in their proper position. The united threads are finally fastened to the throwing spindle J. The machine may be worked either by hand, with a flywheel, or from any existingshafting.

The turning of the plates D and of the spindle J has the effect of causing the threads coming from D to be untwisted, whence the advantage that the threads, when afterwards twisted by the spindle J, are worked up with each other more closely, making thus a stronger cord. The brake for D consists of a plate moving round one side like a one-sided lever; this plate is pressed firmly against the bobbin E by a spring underneath in such a manner that the pressure corresponds always with the state of the winding off. For instance, if the bobbin is filled up it should move slower on account of the larger circumference, it being necessary that the length wound off at each revolution should remain constant.

When the bobbin is in its full state the brake plate presses harder against it, and thus prevents the running off of the thread. The less the quantity of thread the bobbin contains the less the brake is pressed back, whence the bobbin is allowed to rotate more quickly, as required by the diminished circumference. The regulation of the winding is managed in this way very exactly. The guide at U consists of a small wooden plug, in the circumference of which three or four semicircular grooves are cut, these forming, with the surrounding bush of iron, the guide holes, through each of which one of the threads to be spun is passed. The twisting of the threads has to take place, therefore, constantly within the distance between the guide U and the guide pulley at the top of the spindle J, whence a guarantee for the uniformity of the thread is obtained.

Other kinds of cords are made by covering less expensive material with good material, as, for instance, by spinning silk over cotton. A machine of this kind, for covering the rods of whips, is to be seen at the Exhibition, but it is unfortunately not at work. Machines of this kind are called winding or covering machines, and the machines for covering telegraph wires, the pure winding machines, and the flower-binding machine for millinery work, exhibited by Rast, of Vienna, belong to this class. Such machines are exhibited in the Austrian department by MM. Carl Arzt, Georg Hutter, Carl Mühlenfroh, Franz Schoenbrunner, and Franz Hartmann, all of Vienna. These exhibited machines, however, are all constructed on well-known and old principles, and it is not worth while to say any more about them here, with the exception of describing the disengaging gear for bobbin and roller, and the arrangement of the brake adopted by Mr. Hutter. The annexed sketch shows the construction formerly, and even now often, adopted for these machines, although it works slowly.

The hollow shaft *a* carries the rope pulley *g*, for receiving the motion and the roller *b* for the material to be used for winding or covering; the



thread of this material passes from this roller through the eyes *d* and *e*, and is then fastened to the cord *f* of cotton or string, which comes through *a* over the small pulley *c*. While the thread is passing slowly through the hollow shaft, the guide with the eyes *e* winds the better material from the roller *b* more or less tightly over and round the thread *f*, according to the difference of the speed between the rotation of the roller and the travel of the thread.

It is very easy to understand that this kind of covering arrangement could not do much work, although some of these machines are provided with between twenty and thirty of such tubes. In order to facilitate and increase this work, and in order to save material, Mr. G. Stein, of Berlin, has constructed a suitable machine, the design of which is based upon the principle of covering the ground material at once with from eight to fifteen threads, which are arranged and stretched side by side, whence the work produced is very much increased. This machine, which has been daily at work at the Vienna Exhibition, and which is shown by our engraving on page 358, may also be used, if not for winding or spinning, as a simple doubling or twisting machine.

As will be seen from our engraving, N is the table upon which the rollers with the material are fastened. The threads of the material forming the groundwork of the cord pass over one of the steps of the roller T, then over the roller K, along the guides *x* to the spindles *s*, and from thence to the bobbins G. The latter are placed upon the bobbin table H, whilst the spindles pass through it, and are connected by means of bevel gearing with the shaft C C, which receives its motion from the pulleys P P. The upward and downward travel of H is effected by the shaft Z, and the wheels D and E', which are fixed to the frame A. In this manner the machine works if used for twisting or dou-

bling. If used for winding or covering, however, the material adopted for this purpose is passed specially through the small guides of the guide-plate M', and from thence, in combinations of from eight to fifteen threads each, over the distributing hooks O, which are indicated in the engraving in a simple manner only, whilst they are in reality of a complicated construction. Each hook O arranges the threads close to each other in a plane, in which position they come in contact with the ground material, which they surround as the latter rotates. A great advantage of the construction of this machine is that each spindle works independently from the other, and that various speeds can be given to the various spindles by changing the wheels, whilst each spindle can be stopped without interfering with the motion of the others, whence various kinds of cords can be spun over simultaneously on this machine. We should mention here that Mr. G. Stein, of Berlin, exhibits also a machine for the covering of buttons.

We have now to speak about the embroidering machines exhibited at Vienna. We find at the exhibition connected with sewing machines a number of small appliances, which may be considered as embroidering apparatus, and all of which produce a one-sided chain stitch, or sometimes also a double chain and surface stitch. The sewing machines not offering, as such, sufficient space for larger embroidered surfaces, the tambouring, chain, and coarse embroidering machines designed for this purpose have been provided with special arm-shafts, which carry the needle and the tambouring apparatus, and which can be moved towards all sides. The motion is transferred from a vertical shaft to a needle by means of bevel gear, or by pulleys and cords, and sometimes by universal joints, whilst the guiding of the needle through the arcs and curves of the pattern is effected by a movable parallelogram.

Machines of this kind are exhibited at Vienna by several manufacturers, amongst whom we have to mention Mr. Heinrich Schatz, of Weingarten, in Würtemberg, whose machine is well arranged, carrying at the bottom a rope drum, which is put in rotation by a foot-board. From this drum the shaft, carried by the movable sewing arm, and working the needle, is moved directly by a cord. An experienced worker can make with this machine from 800 to 1200 stitches per minute. The Sächsische Stickmaschinen-Fabrik, of Kappel, near Chemnitz, exhibits also such a machine, but with four arms fixed to the main shaft. The stuff to be embroidered is fixed uniformly in four departments of a frame, for each of which an embroidering arm is provided. All four arms are moved simultaneously and uniformly by means of a guide and parallel motion. We should mention that this machine is arranged in such a manner that the frame may be extended to the length required. Each of the arms can make about 800 stitches per minute. We may also mention here the embroidering machine by Bonnaz, exhibited by E. Comely, of Paris; we shall return to it when reporting on sewing machines.

Mr. Joseph Buda, of Vienna, exhibits a needle-embroidering machine, which is similarly arranged to the looms for figuring in the weaving of ribbons, and which is more of a loom than an embroidering machine. Of greater interest, however, are embroidering machines on Heilmann's system, of which three are to be found at the Exhibition, exhibited by the Maschinen Werkstätte of St. Georgen, near St. Gallen, by the Sächsische Stickmaschinen-Fabrik, of Kappel, near Chemnitz, and the third by Messrs. Rieter and Co., of Switzerland. The three machines are all constructed in the same manner, carrying in a suitable wide frame the suspended embroidering frame, which is prevented from oscillating by properly fixed guides. This frame is fastened to the so-called "Aufkamm" apparatus, which consists in general of a combination of levers with movable parallelogram, one side of which moves in a pentagon, the pointer of which the worker causes to follow the pattern, drawn in about ten times the size of the pattern to be stitched by the machine. It will be understood that the movement of the tracing point over the pattern is followed exactly, but on a reduced scale, by the frame carrying the material, and when the tracing point is placed in any given position on the pattern, that position marks the place in the pattern on the fabric where the next stitch will be made. The needles, which are supported by a "carriage," are all provided with an eye in the centre, and are carried at the end by a pair of nippers. The carriage

advances close to the stuff stretched out, and its advance causes all the needles provided with threads to pierce through. At the other side of the stuff a second carriage has arrived, which takes off the needles after they have been set free by the opening of the nippers already mentioned. This second carriage is then drawn back as far as the length of the thread will allow. The worker now marks the next point on the pattern when the frame, with the stuff stretched upon it, is brought into the corresponding position, and the second carriage is advanced close to the stuff, repeating thus the stitching manipulations. Apparatus for bordering, figuring, and circular stitching are connected with these machines. The number of needles varies, according to the machine being single or double acting, sometimes even three lines of embroidering needles are applied. The work done by these machines varies between 1500 and 3000 stitches per day. The machine exhibited by the Maschinen-Fabrik, St. Gallen has two lines of needles, and the single needles are placed at distances of $1\frac{1}{4}$ in.; the machine is provided with a so-called "boring" apparatus, that is to say, with a contrivance for the cutting out of circular holes, round which the stitching has been finished. The machine is exceedingly well built, and works well without interruption. The same can be said of the two other machines.

The Sächsische Stickmaschinen-Fabrik, of Kappel, exhibits further a machine for the "pricking" of patterns, so that the perforated drawing may be used as a sort of stencil plate for the first print of the pattern.