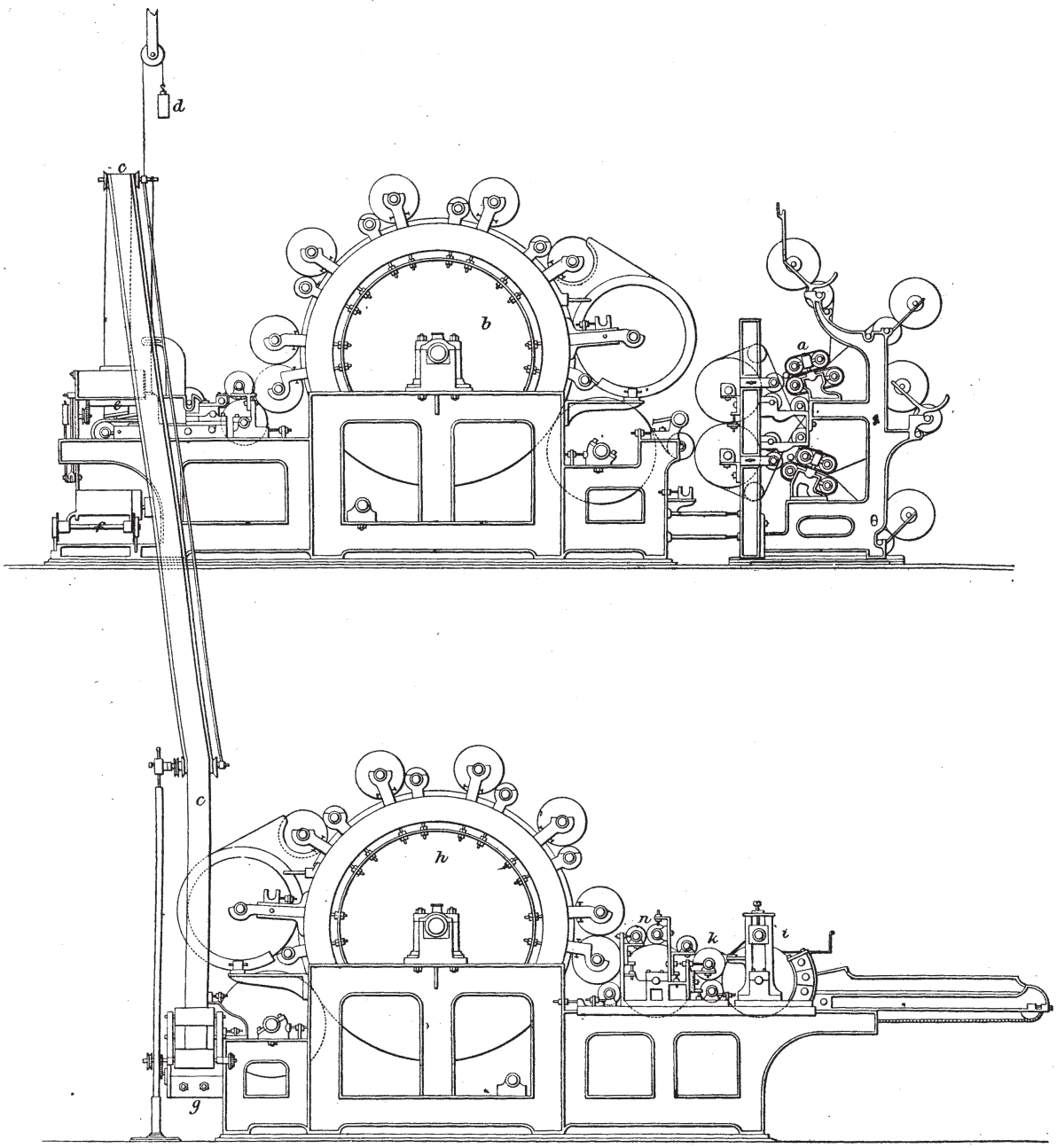
CARDING MACHINES FOR WOOL, AT THE VIENNA EXHIBITION.

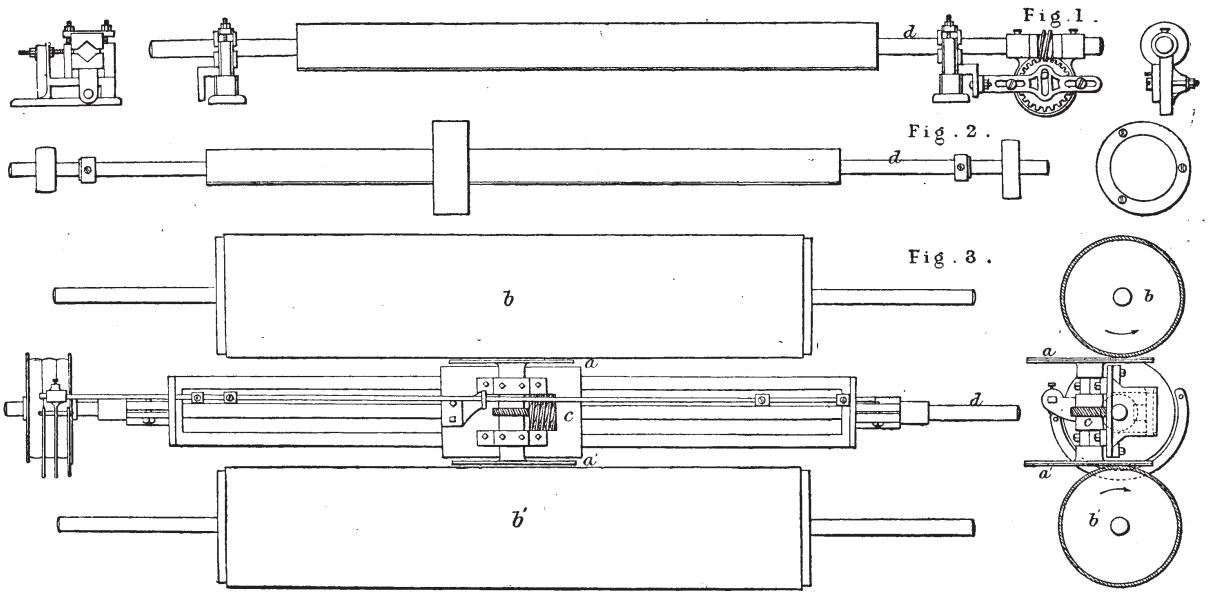
CONSTRUCTED BY M. CELESTIN MARTIN, ENGINEER, VERVIERS, BELGIUM.

(*For Description, see opposite Page.*)



APPARATUS FOR CLEANING CARDS, AT THE VIENNA EXHIBITION.

CONSTRUCTED BY M. CELESTIN MARTIN, ENGINEER, VERVIERS, BELGIUM.



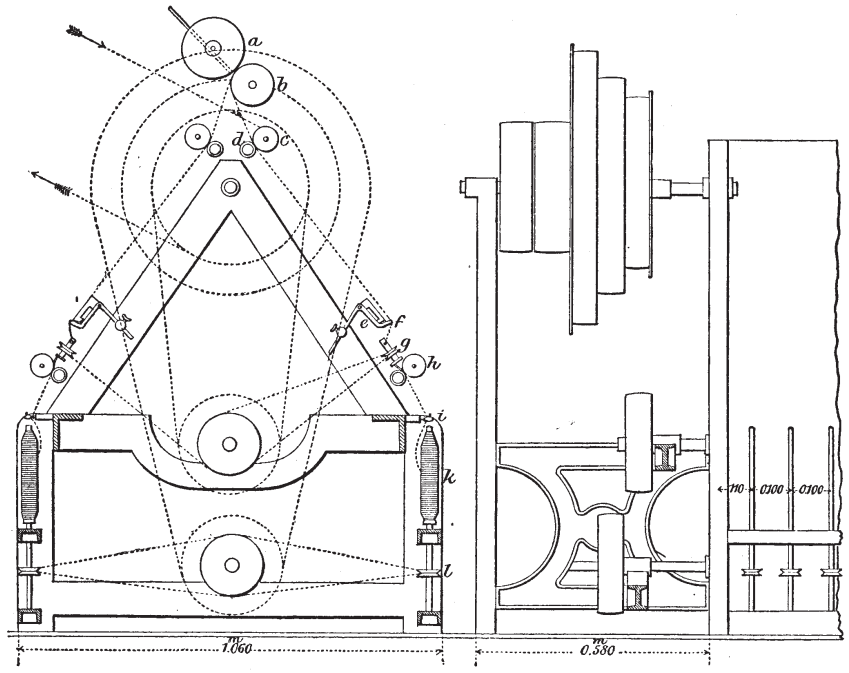
TEXTILE INDUSTRY AT THE VIENNA EXHIBITION.—No. IX.

By Dr. H. Grothe.

Wool-Spinning Machinery.—(*Continued.*)

We now pass on to the carding apparatus exhibited by M. Martin, who exhibits two systems, one with two carders for wool of ordinary and middle quality, and the other with three carders for fine wool. The two systems differ only from each other in the arrangement of the doffers and of the feeders. Our illustration on the opposite page represents the apparatus with two carding machines, and we may mention that the arrangement with three machines is provided with a breaking card with self-acting feeders. The machines of this arrangement have a working width of 1.50 metres (4 ft. 11 in.); the carding drum and the doffing cylinder are of cast iron, the shaft of steel, the clearers of hollow wrought iron, whilst the strippers and scutchers are made of sheet iron with pasteboard. This latter system reduces the weight of the cylinders, but gives them the same strength as if made of cast iron, whence machines of large width may be built without difficulty.

The system of movable bearings and bushes applied to these machines is certainly the best that has been introduced. The bushes or bearings, each carrying an oil vessel, surround the journals completely, and thus prevent the fibres of the wool from coming in contact with them and taking off the oil for lubricating the journals. These bearings being movable and self-adjusting, the journals are always supported uniformly over their whole length, whether the machine is placed on a level or not. The pulleys for driving the principal parts are of the largest possible diameter, and are covered with leather, in order to prevent any slipping of the belts, without it being necessary to run the latter too tight; the wear and tear of the belts is thus decreased, and power is saved. Above the scutchers a wind shaft is fixed for the purpose of diminishing the throwing out of the scutchers and preventing the formation of a current of air in the middle of the machine. The importance of this improvement will be best understood by observing how, in ordinary machines, the fibres of the wool thrown out by the scutchers are drawn together towards the middle by the current of air, and are given back through all the rollers of the carders, thus causing the thickness of the roving to be greater at the centre than at the two sides.



WOOL-SPINNING MACHINE, BY M. CELESTIN MARTIN, VERVIERS.

The first carding machine is designed with a feeding cloth for the simple feeding by hand of the "entrance rollers or taker-in," from which the wool is taken to the following rollers by means of a cylinder with teeth, which push back all foreign substances and burrs; the following rollers consist of a second "taker-in," with teeth provided with two strippers, and two clearers also with teeth. Two small rollers fixed under the two "takers-in" prevent the falling off of the wool, and regulate the feeding of the carders. The advantages of such an arrangement are evident; the wool is worked gradually, the flocks of the wool are opened by small cylinders moving very slowly, and it arrives at the carding rollers in such an open and clean state that the cards can be used much longer, and require less maintenance and repair than is usually the case.

In the system with three carding machines for a fine quality of wool, a simple endless fleece apparatus is fixed at the exit from the "taker in" for the forming of the fleece. The second, or fleece carder, is provided at the front with a feeding table and three taking-in rollers, and at the back with a double endless fleece apparatus. The fleece formed by this apparatus has a length of nearly 14 metres; it is rolled on a wooden roller, and feeds the carders. This system of feeding appears to us to be one of the best for an arrangement with three machines.

For the same system, but for the production of coarser wool, the endless woollen-ribbon apparatus, as shown in the illustration, is best suited; this apparatus produces ribbons *c* of about 4 in. in width, which are brought by a self-acting apparatus and the feeding cloth to the second carder. The third carder is provided with an apparatus of peculiar construction for the formation of threads; it was invented by M. Martin about three years ago, has often been described, and is designated in the illustration by *a*. This so-called "small band" apparatus forms for finer wool 120 roving threads with four rollers, but for coarser wool only two rollers. The chief advantages of this new arrangement will be understood from the following explanations. The doffing cylinder of the intermediate carder being fully clothed, it assists for its full width in the carding of the wool, exactly in the same manner as the "taking-in" carders, whence a larger quantity of wool can be worked through than with doffing cylinders divided in the ordinary manner into rings. The fleece is taken off from the doffer by a single hook, so that a greater regularity of the

threads is secured, the tearing of the fleece, which is necessary with the divided doffing cylinder, being prevented in this case. The "small band" apparatus allows of increasing the number of the threads very considerably, even up to 120 for carders of 1.200 metres in width. This increase in the number of the threads, combined with nearly double the production, offers the possibility of spinning one and the same wool to a considerably higher number, and of omitting entirely the second spinning of the wool, notwithstanding the quality of the latter, and the number of the yarns to be spun. By a careful attention to the machines, the quantity of the waste may be considerably reduced.

This apparatus can be easily fixed to any existing carding machine, and is of equal advantage for all sorts of wool, whether long or short, or whether mungo and shoddy.

We must next speak of the cleaning apparatus for cards, exhibited by M. Martin. The three different systems, represented in Figs. 1, 2, and 3, on the present page, are not the invention of M. Celestin Martin, but are of English origin, and have been adopted by him. If one or the other of these systems is applied, two strippers may, in any case, be sharpened at the same time. The full roller represented in Fig. 1, is movable on the axle *d* by means of the wheel shown in the sketch, the reciprocating motion being obtained from this wheel by a crank pin, transferring a sliding motion to the bush, which, passing round the axle *d*, serves as support for the sharpening roller. In Fig. 2, the axle *d*, which passes through the bush carrying the rotating disc, is provided with right and left hand threads, and the bush has, over the whole length, parallel with the longitudinal axis, a narrow slot, through which a pin of the disc fits into the threads; it is thus evident that if the axis is turned round, the threads will move the pin, and also the sharpening disc, from one side of the axle to the other, producing, therefore, continually, an alternate motion besides the rotating one. Fig. 3 represents the third apparatus, containing a cylinder, or properly speaking, a slide *c* upon the axis *d*, this slide having double sharpening or grinding discs *a a*, which have a rotating, and at the same a forward and backward motion over the whole width of the cards. M. Martin prefers the latter system, and we ourselves are of the opinion that it should give the best results, on account of its grinding more quickly than any other arrangement, and giving the cards a sharper cut, as the teeth are ground into sharp points, whence the additional grinding by hand becomes entirely useless; the arrangement allows, moreover, the use of cards of large width. The figure shows the system in working order, two strippers *b* and *b'* being sharpened at the same time.

M. Celestin Martin exhibits, finally, a new construction of an unsupported spinning machine without carriage for wool. This design is a new step toward the provision of a machine by means of which the slubbing may be performed in a more simple manner than is at present done by the use of self-actors. The experiments of M. Aug. Vimont, of Vive (Calvados), and of Mr. Sykes, in Yorkshire, have not had the result necessary for the application of the water system to carded wool, namely, that the spinning machine should regulate the irregularities of the roving during the spinning. This condition, however, must be fulfilled. In Vimont's system, the sliver, after having passed the rollers, obtains from the spindle a twisting that is too quick, especially at the thinner of the unequal places, and which cannot be removed by any means, producing thus a varying textile fabric. Vimont wished to prevent this twisting, and designed his wing apparatus, by means of which he succeeded very well with respect to the vibration of the thread, but the contact with the edges of the wing were too momentary, so that they could not interfere with the rapid progress of the twisting. This aim is, however, much better attained by an alteration of Vimont's machine, made by Messrs. Bede and Co., of Verviers (Société Houget and Teston) who substitute in their new arrangement a two-armed scutcher with longer wings, the edges of which are covered with rough leather, for the flat, small, three-armed scutcher. By these alterations the thread is kept fast during a longer time, and may be more conveniently extended, without being twisted before the straining. During the extension on the self-actor, the gradual straining, which is nothing but the difference between the speed of the paying-off cylinders and that of the carriage, is accompanied by a slight tendency to twisting, because the spindles

Table of Weights for each Single Thread of a Self-Actor of 360 Spindles.

Twelve Rollers (of Thirty Threads each).—Weight of each Skein in Grammes.

Number.	1. Roller.	2. Roller.	3. Roller.	4. Roller.	5. Roller.	6. Roller.	7. Roller.	9. Roller.	9. Roller.	10. Roller.	11. Roller.	12. Roller.
1	10.75	10.75	11	11	10.75	11	10.50	11	11.25	10.75	11	10.75
2	11	11	10.50	11	10	11.50	10.50	11	11	11.25	11.50	10.50
3	10.25	10.50	10.75	10.75	11	11	11.50	10	11.25	11	10.50	10.75
4	10.50	10.75	10.75	10.75	10.50	10.75	10.50	11.25	10.75	10.75	10.50	10.50
5	10.25	10.50	10.75	10.75	10.50	10.75	10.50	11.25	10.75	10.75	11	11.75
6	10.50	10.50	10.75	10.75	10.50	10.75	10.50	11.25	10.75	11	11.50	11.25
7	10.75	10.25	10.75	10.25	10.75	11.25	10.25	11.25	10.25	10.75	11.50	11
8	10	10.25	10.50	10.50	10.75	10.75	11	10.50	11.75	11.25	10.50	11.50
9	10.25	10.50	10.50	10.25	11	10.75	10.50	10.50	10.75	10.50	10.50	10.75
10	10.25	10.50	10.75	10.25	10.50	11.50	10.50	10.50	11.25	10.75	11.25	11.25
11	11	10.75	10.25	11.25	10.25	11	10.75	11	11.25	11	11.50	11
12	10.75	10	11	11.25	11	10	10.75	10.50	11	11.25	10.25	10.75
13	10.75	10.50	11	11.50	10.50	11	10.50	10.50	11	11	10.75	11
14	10.75	10.50	11	11	10.50	10.75	11	10.75	11.25	11	11	10.50
15	10.75	11	10.75	11.50	10.50	11.25	11.50	11.25	10.75	11.50	11.75	11
16	10.75	10.75	10.75	11	11	11	10.50	10.25	11.25	10.25	11	11
17	11	10.75	10.75	11.25	10.25	10.75	10.75	10.25	11.25	10.50	11.25	11
18	10.75	10.50	10.50	10.75	10.50	10.75	10.75	10.75	11	10.75	11	10.50
19	10.25	11.25	10	10.50	10.75	11	10.50	10.75	11.50	10.25	11	10.75
20	10.75	11	10.50	11.50	10.25	11	11	10	10.50	10.50	10.50	10.75
21	10.75	10.75	10.75	10.75	11.25	10.50	10.25	10.25	11.25	10.50	10.75	10.75
22	10.75	10.75	10.25	11	11	11	10.50	11	11	10.50	11	11
23	10.75	10.75	10.75	10.25	10.75	10.75	10.50	10.25	11.25	10.75	10.50	10.50
24	10.75	10.50	10.25	10.50	11	11.25	10	10.25	11	10.25	11	11
25	11	10.75	10.75	10.25	11	11	10.25	10.75	11.25	10.75	11.50	11.75
26	11	11	10.75	11.25	11	11	10.50	10.75	10.75	10.50	11.50	10.75
27	10.25	10.50	10.50	11	10.75	10.75	10.50	10	11.25	10.75	11.25	10.50
28	10.25	10.50	10.75	11.25	10.50	10.75	10.50	10.50	11.25	10.75	11.50	10.75
29	10.25	10.25	10	11.25	10.25	10.75	11	9.75	11	11	11.50	11
30	13	9.50	10.25	11.25	10.50	12.50	12	11.75	11.25	11.75	12	12.50
Finest thread ...	10	$9\frac{5}{8}$	10	10	10	10	10	$9\frac{3}{4}$	$10\frac{1}{4}$	$10\frac{1}{4}$	$10\frac{1}{4}$	$10\frac{1}{4}$
Coarsest thread ...	13	$11\frac{1}{4}$	11	$11\frac{1}{4}$	$11\frac{1}{4}$	$12\frac{1}{2}$	12	$11\frac{3}{4}$	$10\frac{3}{4}$	$11\frac{3}{4}$	12	$12\frac{1}{2}$
Difference per roller	$30\frac{0}{0}$	$18\frac{4.0}{100}$	$10\frac{0}{0}$	$15\frac{0}{0}$	$12\frac{1}{2}$	$25\frac{0}{0}$	$20\frac{0}{0}$	$20\frac{1}{2}$	$4\frac{8}{15}$	$14\frac{6}{15}$	$17\frac{0}{0}$	$19\frac{1.0}{20}$

Difference between all rollers 37 per cent.

move round in the beginning slowly, and also because a tight straining exists from the backing-off wire to the paying-off cylinders, whence the yarn is firmly pressed against the wire, forming thus a fixed point, beyond which the twisting extends only to an insignificant extent. The aim of all improvements should, therefore, be to give time to the sliver delivered into the machine under a slightly increasing twist, for a uniform straining. However, even a small degree of twisting is objectionable, as it becomes the cause of a complete drawing out of the thread, and consequently of an unbecoming textile fabric. M. Martin considers that he has now found in his spinning machine the proper medium, and that the yarns are spun on his machine much more uniformly. In order to prove this, M. Martin has weighed exactly the yarns produced by well designed self-actors, and has thus proved how much the single threads differ on one and the same machine. We annex this Table, which is of considerable interest.

The threads produced by M. Martin's new machine show an insignificant difference of weight only. And how does M. Martin attain this aim? By having invented a contrivance which acts in such a manner, that the threads during the process of spinning undergo the same straining. M. Martin's machine has for each thread an independent apparatus, which the thread itself puts into action, and the effect of which depends upon the strain on that thread, whence without altering anything in the machine, the same thread may be spun for 1000 or for 10,000 metres per kilogramme of its weight. The illustration on page 287 represents this machine. A strong frame carries the spindle roving frame with the bearings for the spindles, which latter extend through the carriage carrying at the lower end the rope pulley *l*, and at the upper part the bobbin *k* for the winding up of the yarn. The table of the frame carries another triangular frame at the top of which are fixed the bearings or supports for the roving rollers *a* and the rollers *b*, the latter of which are driven, and put the former in motion. The yarn passes then through the two rollers *d* and *e* to the important apparatus *f*, which contains M. Martin's invention, and from there to the rapidly rotating tube *g* and the pair of rollers *h*, and afterwards through the guide *i* to the spindle, *k*, where the uniform winding up by the spindle apparatus takes place. The thread is strained through the rollers *c*, *d*, and *h*. The apparatus *f*, however —which is nothing but a counterbalanced brake, carrying at the front part a plate covered with leather, and at the other part an adjustable counter-weight for compensating the influence of the strain of the thread—produces a uniform strain and a regulation of the irregularities of the threads, whilst the tube, *g*, transfers to the thread a slight temporary twisting. At the right-hand side of the figure the normal position of the lever is indicated, whilst at the left-hand side the lever is pressed down by the increased strain on the thread, and the latter lies flat upon the leather, whence the friction at that place prevents the twisting through the small tube from being extended to the rollers *c d*. Whether this machine possesses really all the advantages which are claimed by the inventor, we will not investigate here; practice will soon decide on this point.