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

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MACHINERY FOR PREPARING FLAX.

IN a previous article we spoke in general terms of the flax and similar fibres and also on the collection of machinery necessary for their treatment, as exhibited at Vienna. In the present article we shall speak specially of the machines for the preliminary treatment of flax.

The collection of these machines was very large, and consisted of exhibits from all parts of the world, England, Germany, France, Russia, Portugal, Austria, Hungary, America, Belgium, Holland, and Italy being well represented. In speaking of these we shall begin with those for the preparation of raw flax, that is to say, with the seeding, breaking, scutching, and hackling machines, while in a future article we shall deal with the machines for finishing and spinning the flax, such as cards, spreaders, drawing, roving, and twisting frames, concluding with the machines for the working of jute, hemp, tow, China-grass, and other fibres of that kind.

We commence with the flax seeding rollers of Messers. E. R. and F. Turner, of Ipswich, which are represented by Fig. 1 on the next page. These rollers, which are used for extracting the seed from the raw flax, are driven either by steam or horse power at a considerable velocity. The upper roller *a* is driven by contact with the lower roller *b*, and it is free to rise in the bearings of the frame A. The rollers being put in rotation, the seed-ends of the flax straw are passed by hand between them, and the seed is broken by the roller *a*. The rollers are each 1 ft. in diameter and are 2 ft. long. The whole machine may also be made portable, by mounting it on wheels, a great convenience in many cases.

For the breaking of flax, hemp, and jute, eight machines were shown at Vienna, and amongst these we may first notice that by Dr. Collyer. This machine represents one of the older constructions; it is simple and conveniently arranged, and has often been copied. For example, the flax-breaking machine of Paul Lagac-Crombet, of Courtrai, which was exhibited in the Belgian department, was a copy of Dr. Collyer's machine. The arrangement of this latter machine is illustrated by the diagram Fig. 2, which we give on the next page, and is in principle as follows: The machine which is fed over the table *g*, consists of the drum *b* with a grooved surface, the axis *c* of which carries a sector with the two rollers *a a*, which are also grooved on their surfaces, and which are pressed against the drum. At the lower end, the sector is connected with an arm *d*, which receives an oscillating motion by means of the crank and rod *e* and the shaft *f*. The drum rotates constantly and carries off the flax, which is somewhat kept back, however, by the alternate motion of the

rollers *a a*, whence a repeated beating and breaking takes place. Collyer's machine preserves the flax very much on account of the carefully executed motion and turning of the material; the machine is further exceedingly cheap, it can be easily handled, and may be made for being worked either by hand or by steam.

This machine illustrated the principle on which the construction of all flax-breaking machines has of late been based, and which consists in the so-called "pilgrim's step" motion, first introduced by

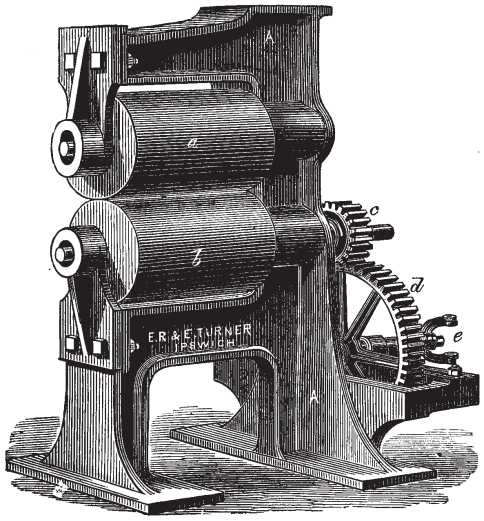


FIG. 1. FLAX SEEDING ROLLERS, CONSTRUCTED BY MESSRS. E. R. AND F. TURNER, IPSWICH.

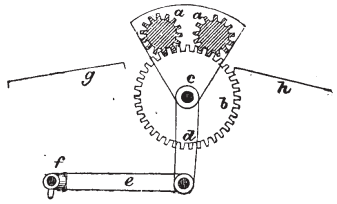


FIG. 2. DIAGRAM OF COLLYER'S FLAX-BREAKING MACHINE.

Dittmar, Hodgkin, and Guild, and afterwards adopted, often of course in a modified form, by Lawson, Luft, Narbuth, Collyer, Lagac-Crombet, &c.

The jute and hemp-breaking machine by Messrs. Samuel Lawson and Sons, of Leeds, of which an outline view is given in Fig. 3, consists of six pairs of grooved rollers A, which are arranged in a quarter circle, the two rollers of each pair being connected by means of spur wheels. The lower rollers are connected by means of pinions with a large spur wheel *i*, which receives its forward and backward motion from the main shaft H through the wheel *h*. From H the motion is transferred by means of a belt passing over the pulleys *a b* to the auxiliary shaft I, and from thence by means of wheel gear *c d e f g* to the pinion *h*, which is supported by an oscillating arm L fastened to the axis of the wheel *i*. The oscillating motion of L effects the forward and backward motion of the wheel *i* at certain intervals. The machine exhibited by Messrs. Lawson at Vienna could break between three and four tons of jute per day, or between one and two tons of Italian or Russian hemp.

Narbuth's machine, of which an outline diagram is given in Fig. 4, is similar in construction to that of Collyer, although the dimensions are larger and the drum is replaced by a series of rollers *b*, each of 5 in. diameter, these being moved by one large spur wheel D. These rollers gear into the breakers *a*, which are carried by the frame A, and which thus oscillate with the latter round the axis C; this oscillating motion, which is transferred from the main shaft through the rods F P and the eccentric G, is a very rapid one. Motion is transferred from the shafting to the pulley O, and from H to M, whence a belt passes to L, this last-named pulley being on the same shaft as the pinions by which the spur wheel D for the lower cutting rollers *b b* is put in rotation. The flax or hemp is placed on the feeding cloth *c*, and passes thence between the breakers, the upper rolls pressing it into the grooves between the knives *b*, where it is broken, whilst the forward and backward motion of the rolls *a* removes the broken wooden parts from the flax. This machine, which requires great power, and which works at a high speed, is largely used in Hungary, where it is much liked and is preferred to any other machine.

Another flax-breaking machine, the principle of which is similar to that upon which the construction

Fig 3.

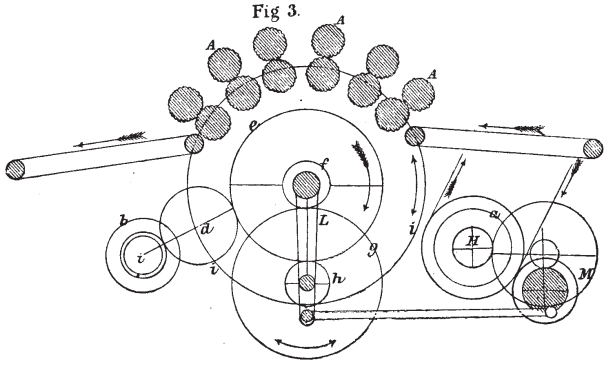


DIAGRAM OF JUTE AND HEMP-BREAKING MACHINE, BY MESSRS. SAMUEL LAWSON AND SONS, OF LEEDS.

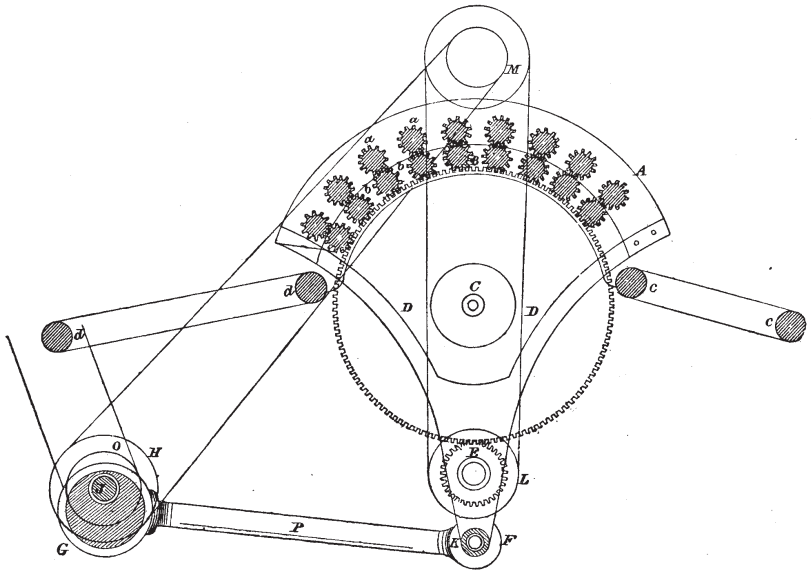


FIG. 4. DIAGRAM OF NARBUTH'S FLAX-BREAKING MACHINE.

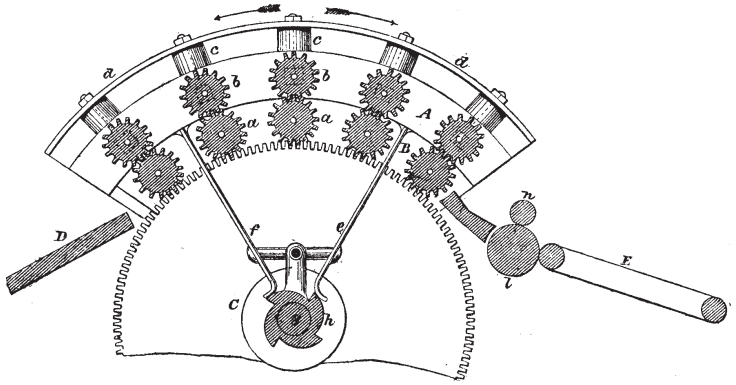
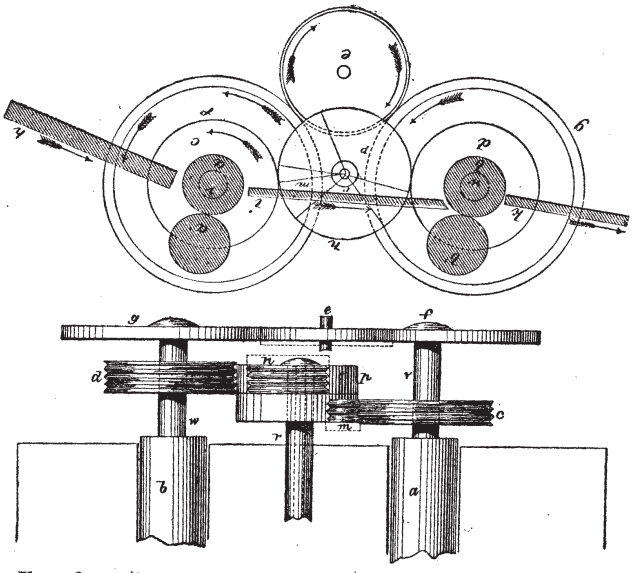


FIG. 5. LUFI'S FLAX-BREAKING MACHINE, CONSTRUCTED BY MR. J. NEUMANN, LEOBERSDORF.

of Narbuth's machine is based, is that shown by the diagram Fig. 5. This machine, designed by Herr Carl Luft, director of the Copin Hemp Works, and constructed by J. Neumann, of Leobersdorf, contains five breaking rollers *a* gearing into the spur wheel C, fixed upon the shaft *g*, and five other breaking rollers *b* pressed by means of buffers *c* and rods *d* against the lower rollers and fixed to the oscillating frame A. These rollers are not cast and planed, as in Narbuth's machine, but are composed of discs with intermediate knives. Each roller is 9 in. in diameter, and is provided with 14 knives. The oscillating motion is produced by a ratchet wheel *h*, working against the ends of the arms. The flax is introduced by means of the feeding cloth E and the rollers *n* and *l*. We consider this machine of less importance and value than that constructed by Narbuth.

A machine more similar to the Hodgkin system than any other previously mentioned is that constructed by F. W. Wameck, of Oels, and shown by Figs. 6 and 7. Wameck's chief idea is to produce alternately a forward and backward motion, and he endeavours to attain this aim by providing his machine with two pairs of rollers *a* and *b*, and by transferring to these rollers a forward and backward motion by means of a friction pulley with a divided rim. One-sixth of one-half of the surface of the pulley *p* is provided with conical grooves *m* gearing into the grooves of the pulley *c*.

About three-sixths of the other half is also provided with grooves *n* gearing into the pulley *d* for the roller *b*. On the shafts of *a* and *b* the spur wheels *f* and *g* are fixed, these wheels being connected with each other by the intermediate wheel *e*. As soon as the grooves *m* cause the pulley *c* to rotate by frictional contact, the pulley *b* will also be turned through the wheels *f e g*; next, through the gearing of *n* into *d* the reverse motion for *b* is produced, and is transferred through *g e f* to the other pair of cutting rollers. This machine could be improved in many points, and it is to be hoped that this may be done with satisfactory results.



FIGS. 6 AND 7. FLAX-BREAKING MACHINE, BY F. W. WAMECK, OF OELS.

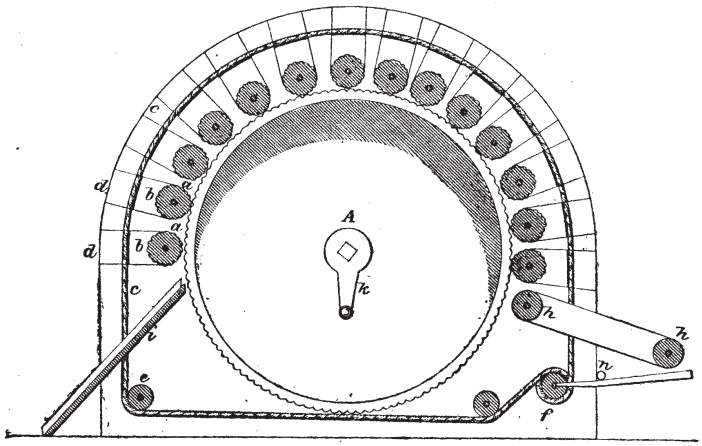


FIG. 9. PORTUGUESE FLAX-BREAKING MACHINE.

A peculiarly constructed hemp-breaking machine was exhibited by an Italian engineer, G. Maria Mure, of Turin. This machine, shown by the diagram Fig. 8, contains between two rims carried by the shaft A four rotating rollers B B′ B″ B‴ provided with grooves. Behind the table *m* a number of grooved boards or plates, loosely connected with each other, are placed, and are made to follow the periphery of the arc C. The hand, when putting the hemp on to the feeding board, is protected by the grating *l*. The hemp passes along the arc C, and is pressed upon the grooves of the latter by the roller B, through the rotation of A. The counter-pressure exerted by C against the beater B is produced by means of the lever D and the weight E.

An ordinary system of breaking rollers was exhibited at Vienna by Leopold Bohm, of Leopoldschlag, near Freistadt, in Upper Austria, this machine having four pair of rollers and being provided with wheel gear—this is all we can say about it. Finally we have to mention a Portuguese machine, which, although represented by a model only, is used extensively in Portugal. This machine, shown in outline by Fig. 9, consists of a large grooved drum A, which is rotated by means of the crank *k*. Around this drum, workers or beaters *a a*, fourteen in number, are placed, these being supported by bearings fastened to the slides *b* moving in the dovetail slots *d d*. In order to regulate the position of all these slides, and to prevent any damage to the rollers in case thick masses of the material are fed to the machine, a strong rope *c* is passed over the slides of all the bearings; this rope runs underneath the machine over the guide pulleys *e e*, and its ends are fastened to the beam *f*, which is turned by means of levers and the desired position of which is secured by the pin *n*. The flax or hemp passes between all the rollers and the drum.

The remainder of the machines for the preliminary treatment of flax we must leave to be described in our next article.

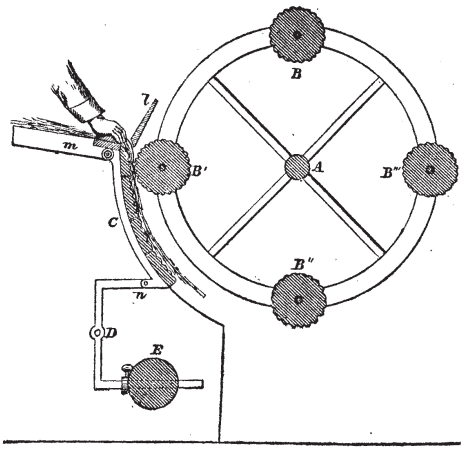


FIG. 8. FLAX-BREAKING MACHINE. BY MR. G. MARIA MURE. TURIN.