French Worsted Drawing

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(A Series of Articles on French Worsted Spinning)

Driving the Winding Rolls.

The rollers of the winding motion have a horizontally vibrating motion as well as a rotary movement and are driven ordinarily in two ways. In the winding devices of carding machines and single or double-roll winders on gill boxes for combed sliver, the roller B*o* slides on shaft *a*, Fig. 118. This shaft imparts the rotary movement to the roller B*o*, whatever may be its lateral position, by means of a key *o* in the shaft, as shown, or in the bore of the roller B*o*; in the latter case there is a key-seat in the shaft *a* in which the key *o* slides.

In the winding devices of drawing frames the rotary movement of B*o* is obtained by the toothed drum *D*, Fig. 121, keyed on an extension of the drawing-roll, Fig. 121, and meshing with a pinion gear *P* keyed on the shaft of the rollers B*o*.

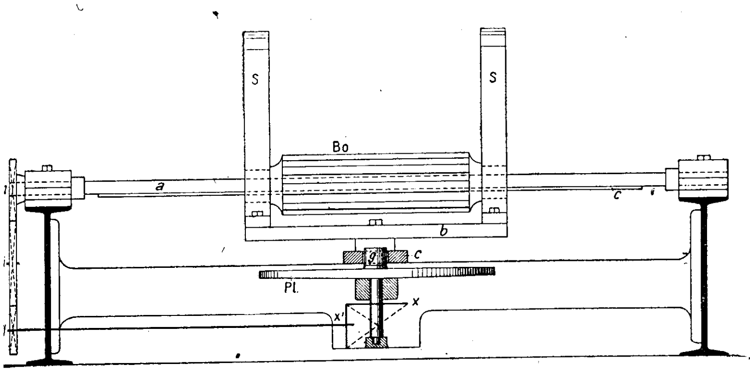

Fig. 118. Winder for Card.

The horizontally vibrating motion of the winding roller is obtained in different ways. On cards and on certain gill-boxes it is obtained by a driving plate. On a cross piece *b* fastened to the supports S, Fig. 118, there is bolted a guide in which a stud *g* fastened to the plate P*l* revolves. The plate P*l* is driven by bevel gears $x\,x^1$ and the chain gears *y, i, z.* This arrangement, shown in Fig. 104, has a vibrating motion which is uniformly accelerated and retarded. The elliptical 68-tooth gear keyed on P*l*, meshes with the 34-tooth eccentric gear, which is driven at a uniform speed. The speed ratio being 2 to 1 and the guide C being perpendicular

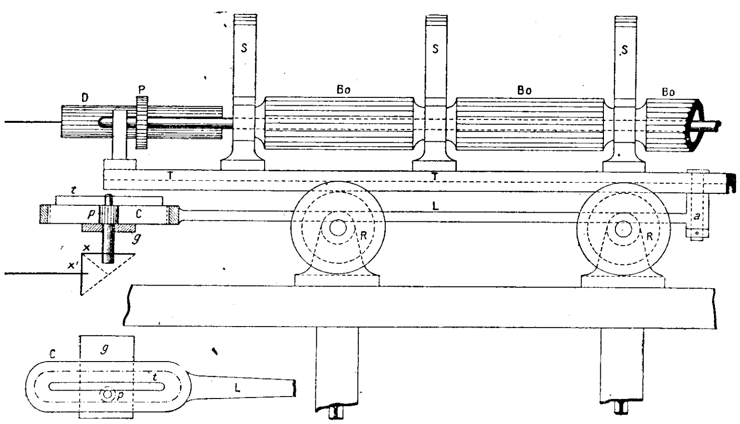

Fig. 121. Winder for Drawing Frame.

to the greatest diameter of the 68-tooth elliptical gear when it coincides with the center of the P*l*, it follows that the stud *g* is driven with a planetary motion that is uniformly accelerated and retarded at each half revolution P*l*, with the result that B*o* vibrates with a uniform movement.

Fig. 137 illustrates the application of the same principle by a crank in place of P*l*. This crank is driven by two eccentric bevel gears. One with 48 teeth is keyed on the crank shaft, and the other with 24 teeth is keyed on a shaft driven by two 36-tooth gears. This drive gives the crank a uniformly accelerated and retarded movement at each half-revolution, whence results the uniformity of the vibrating motion of the carriage T and then of B*o*.

In the porcupine drawing-frames the drive for the vibrating the winding devices consists of an endless gear rack C, Fig. 121, with interior teeth. Fixed on the carriage T of the winder is a casting *a* to which is attached the rod L carrying the gear rack C which rests on a fixed slide *g*. The pinion gear *p* set in a stationary bearing is driven by the gears *z, i, y,* x^1, *x*, and meshes with the teeth of the gear rack C, being guided by the fixed plate *t* fastened to the gear rack. This drive gives a uniformly vibrating movement to the carriage T of the winder. The curves of the gear rack C being of small diameter there is a very brief dwell when the direction of the movement is changed, so that the movement to the right and left can be considered as uniformly continuous, whence results the winding of the sliver into the form of a cylinder.

Because of the sudden change of direction of the gear rack C, the casting *a* is sometimes movably attached on a shaft parallel with T. The position of *a* on this supplementary shaft is determined by the tension of two spiral springs wound around the shaft, which exert pressure on each side of *a*. The springs thus absorb the shock resulting from the sudden reversal of the movement of T causing a slight lateral displacement of *a*, which immediately resumes its original position by the reaction of the springs.

The gear rack is also arranged in other ways. Instead of being horizontal it may be vertical; the gear rack, in place of being movable, remains stationary in a fixed position and the

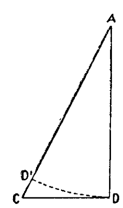

Fig. 122.

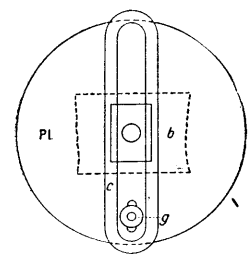

Fig. 119.

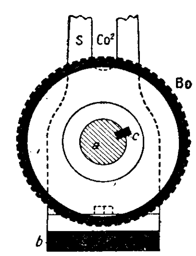

Fig. 120.

pinion gear *p* oscillates by pivoting on a point corresponding with the center of the conical gear x^1. In the latter case the gear C is adjusted to the desired oscillation of *p*.

Tension of the Sliver.

The rotary movement of the winding roller being constant, the vibration of the sliver causes a variation in the tension on the sliver. If we represent the width of the vibration of B*o* by C D, Fig. 122, and the rotary movement of B*o* by A D during the same period, the length wound on the ball will be equal to the hypotenuse A C of the right-angle triangle A C D. The length of the sliver delivered is equal to A D. Placing A D on A C we find the tension of the sliver to be equal to C D^1.

This excess of tension does not have any influence on the section of the sliver and roving because of the natural elasticity of the material, which permits a certain momentary stretching, which is corrected when the sliver is unwound. It is, however, necessary that the vibrating motion of the winder be uniform, in order that the stretch may not exceed certain limits and cause an irregularity in the sliver.