

J. S. ROSENTHAL.

Improvement in Self-Acting Spinning-Mules.

No. 130,155.

Patented Aug. 6, 1872.

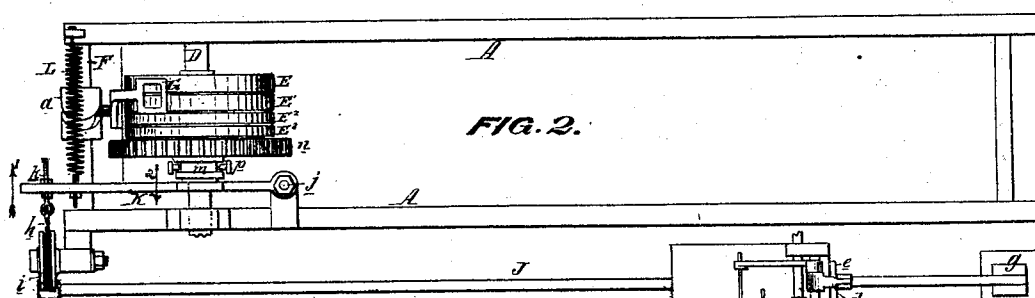
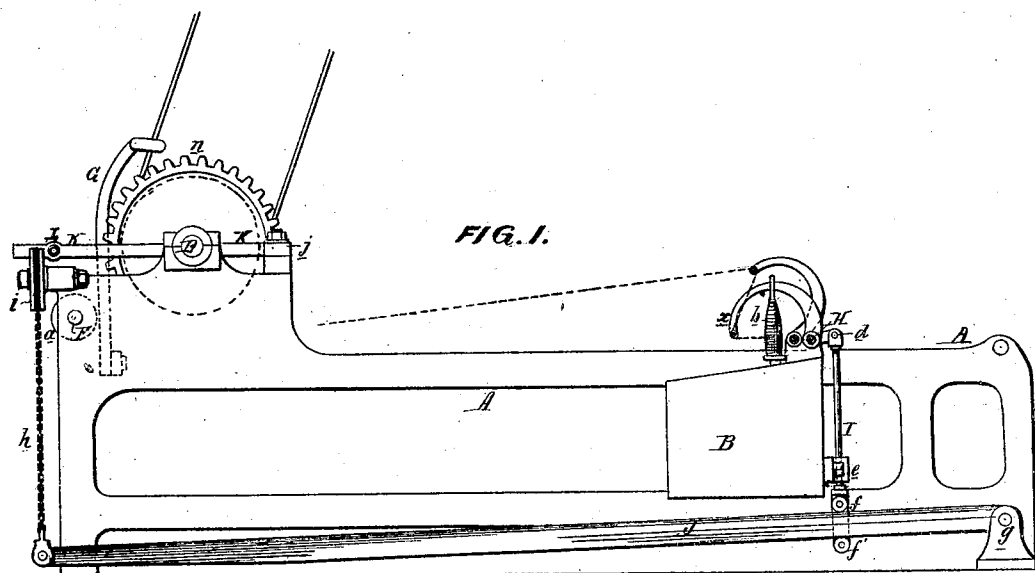
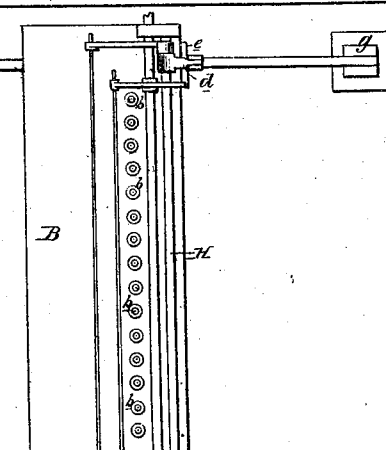
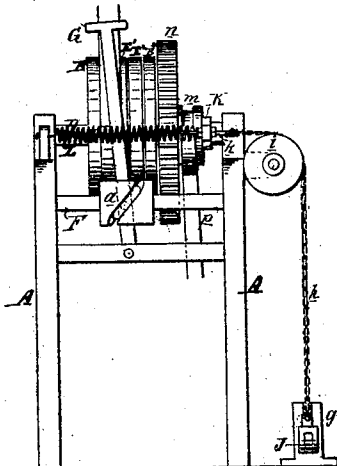


FIG. 5.



Witnesses,
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UNITED STATES PATENT OFFICE.

JOHN S. ROSENTHAL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SELF-ACTING SPINNING-MULES.

Specification forming part of Letters Patent No. 130,155, dated August 6, 1872.

Specification describing certain Improvements in Self-Acting Mules, invented by JOHN S. ROSENTHAL, of Philadelphia, Pennsylvania.

Improvements in Self-Acting Mules.

My invention consists of certain improvements in self-acting mules, fully described hereafter, whereby I am enabled to dispense with the usual complicated appliances for regulating the winding of the yarn upon the spindles.

In the accompanying drawing, Figure 1 is a side elevation of sufficient of a self-acting mule to illustrate my improvements; Fig. 2, a plan view of the same; and Fig. 3, an end view.

As my invention consists merely of certain new parts to be applied to and used in connection with the ordinary and well-known parts of a self-acting mule in place of certain complicated appliances which are dispensed with, all of such well-known parts—such, for instance, as the vertical cam-shaft and transmitting devices, which need not necessarily be shown in illustrating my improvements—have, in order to enable the latter to be represented more prominently, been omitted from the drawing.

The ordinary parts represented are the fixed frame or head-stock A, the carriage B, and the driving-shaft D, with its loose pulley E, fast pulley E¹, pulley E² for operating the slubbing devices, and pulley E³ for operating the twisting mechanism; besides which a cog-wheel and clutch, hereafter referred to, and the belt-shifter G, are also shown. The belt-shifter, however, is not operated in the usual manner, but is controlled and actuated by a cam, *a*, on a horizontal cam-shaft, F, which receives its motion from the ordinary vertical cam-shaft, as will be more fully described hereafter.

Ordinarily the carriage is moved outward from the head-stock by simple devices, deriving their motion from the fast pulley E¹ on the driving-shaft; but in order to effect the drawing in of the carriage and the winding of the yarn upon the spindles *b* it is usual to employ a complicated arrangement of toothed quadrant, chains, springs, catches, and other appliances upon the head-stock and carriage, all deriving their movement from the loose pulley E, which, when the motion of the carriage is

reversed, is made fast by certain automatically-operated devices, which can be thrown off when it is necessary to stop the mule at the end of the drawing in and winding operations.

By means of my invention, which I will now proceed to describe, I am enabled not only to dispense with all of the above-mentioned complicated appliances, but to draw in the carriage by the same devices which are used to move it outward, and also to regulate the winding operation by means of a few appliances of the most simple character, controlled by the pulley E¹, the latter also actuating the said devices by which the movements of the carriage are controlled. The front or stripping faller-rod H on the carriage is provided with an arm or crank, *d*, jointed at its outer end to a vertical rod, I, guided by and arranged to slide through a bracket, *e*, of the carriage, and furnished at its lower end with two anti-friction rollers, *f* and *f'*, the former of which bears against the upper, and the latter against the lower edge of a lever, J, Fig. 1, which is of as great or greater length than the head-stock, and has its fulcrum at a point, *g*, upon or adjacent to the outer end of the latter. The said lever J is connected by a chain or rope, *h*, passing over a pulley, *i*, on the head-stock, to the outer end of a horizontal friction-lever, K, having its fulcrum at a point, *j*, on the head-stock, the connection being made by means of a regulating-screw, *k*, which is operated so as to shorten the chain and form the cop. The friction-lever K is acted on by a strong spiral spring, L, or its equivalent, which tends to draw the said lever in the direction of the arrow 1, Fig. 2, and thus force it against a friction-clutch, *m*, by which the cog-wheel *n* and the ordinary twisting devices deriving their motion therefrom are thrown into and out of gear with the pulley E³ on the driving-shaft. It should be understood, however, that the clutch is not operated by the friction-lever K, but merely held up to its work by the same, the said clutch deriving its motion from a clutch-lever, *p*, constantly acted on by a spring, which tends to throw it outward, and forced inward at the proper intervals by a cam or its equivalent. Whatever movement, however, is given to the clutch must be imparted to the friction-lever bearing against the same, which movement is transmitted through the chain *h*

to the lever J, and thence to the faller-rod H, thus regulating the winding, as hereafter described.

The operation of the mule, or of that portion of it to which my invention relates, is as follows: The carriage is moved outward from the head-stock, as usual, by devices connected with and receiving their motion from the fast pulley E¹, the slubbing receiving during this motion the necessary slight twist; and when the carriage has been moved about half way out the paying out of the slubbing ceases and the drawing commences; the driving-belt is then automatically shifted by the fork G partially onto the pulley E², which increases the twist and the speed of the carriage. The belt is next, after the carriage has reached the limit of its outward movement, shifted to the pulley E³, which, through the cog-wheel *n* and clutch *m*, now held up against it by the friction-lever K, operates the twisting mechanism and finishes the thread. As soon as the twisting has been accomplished the whole movement is reversed, as usual, by means of the vertical cam-shaft, which also, through the medium of the clutch-lever *p* and cam *a* on the horizontal cam-shaft F, moves the clutch *m* and friction-lever K in the direction of the arrow 2, and thus throws off the twisting mechanism, and at the same time shifts the driving-belt to a position partly on the fixed driving-pulley E¹ and partly on the loose pulley E. The shifting of the belt to this position, instead of entirely onto the loose pulley, enables the fast pulley E¹ to draw in the carriage by the same devices which are used for moving it outward, the direction of the motion of these devices being reversed, when the belt is shifted, by means of the vertical cam-shaft. By means of the fast pulley and such simple devices as an endless rope and grooved pulleys on the head-stock and carriage I can also rotate the spindles so as to wind up the yarn as the carriage is drawn inward. The back movement of the clutch *m* and friction-lever K, which occurs before the shifting of the belt, releases and lowers the lever

J to the position shown in Fig. 1, so that as the carriage is drawn in the said lever J, which serves as a guide for and determines the movement of the vertical rod I, connected with the faller-rod H, will cause the said rod I to be gradually lowered as it moves over the same, thus gradually raising the arms *x* of the faller-rod, and causing the yarn to be properly wound upon the spindles and the cop to be properly built. When the lever K is thrown outward by the clutch it will be acted on in one direction by the spring attached to the clutch-lever, and in the opposite direction by its own spring L, and being thus held by and between two springs it will necessarily, when the machine is in operation, be caused to constantly vibrate to a slight extent, which vibration will be imparted to the lever J and thence to the faller-rod, causing the latter to rise and fall to a limited extent as it lays the thread upon the bobbin. By curving or waving the lever J, so as to cause the rod I to rise and fall several times in passing over the same, I can cross the yarn as it is wound upon the spindles several times in each stretch.

Although I have referred to other devices than those connected directly with the lever J, I do not here make any claim to the same, as they form the subject of a separate application for Letters Patent.

Claim.

The combination, substantially as described, of the friction-lever K, chain or other connection *h*, building-lever J, and the devices herein described, or their equivalents, for controlling the movements of the faller-rod H from the said building-lever.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

J. SY. ROSENTHAL.

Witnesses:

WM. A. STEEL,
HARRY SMITH.