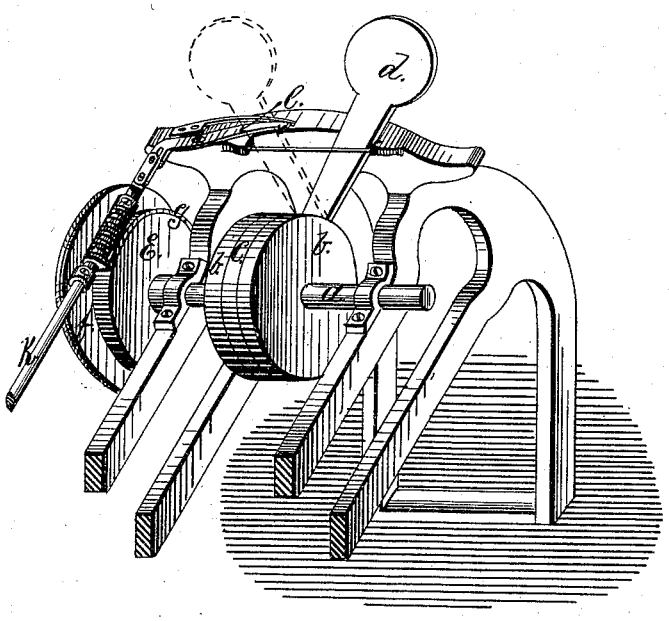
3 Sheets—Sheet 1.

A. HOWLAND & H. LAWTON.

Shipping Mechanism for Spinning-Mules.

No. 198,742. **Patented Jan. 1, 1878.**

Fig. 1.



WITNESSES.

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Fig. 2.

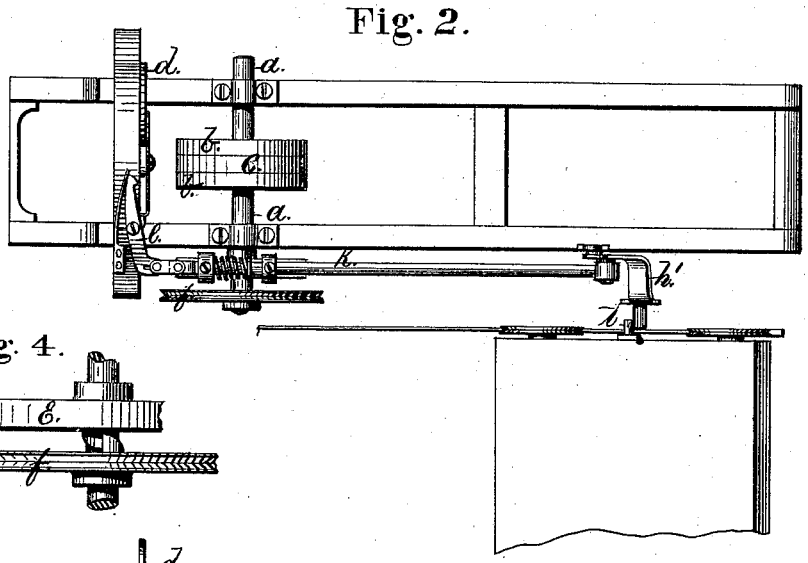


Fig. 4.

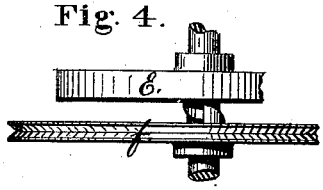
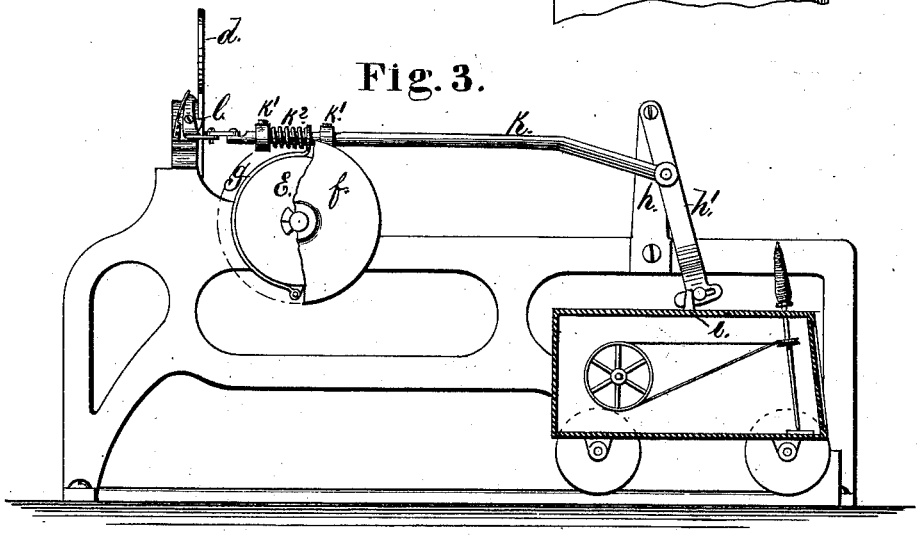


Fig. 3.



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Shipping Mechanism for Spinning-Mules.

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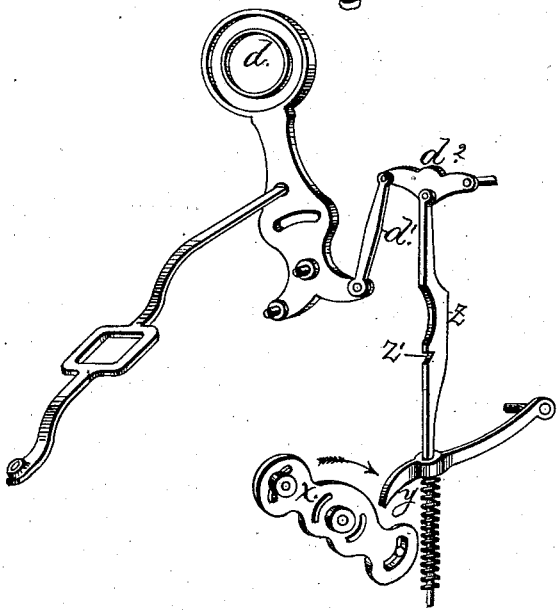
Fig. 5.



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UNITED STATES PATENT OFFICE.

ANGELO HOWLAND AND HAROLD LAWTON, OF WESTERLY, R. I.

IMPROVEMENT IN SHIPPING MECHANISMS FOR SPINNING-MULES.

Specification forming part of Letters Patent No. **198,742**, dated January 1, 1878; application filed July 18, 1877.

To all whom it may concern:

Be it known that we, ANGELO HOWLAND and HAROLD LAWTON, both of Westerly, in the county of Washington and State of Rhode Island, have invented certain new and useful Improvements in Shipping Mechanism. for Spinning-Mules; and we do hereby declare that the following is a full, clear, and exact description of the same, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

This invention has reference to improvements in that part of a mule spinning-frame known in the art as the "mule-head," by which the carriage on which the spindles are located is moved in and out and the spindles driven.

The object of the invention is to save the time now lost at the end of the outward run of the carriage, and continue the reciprocation of the same, so as to increase the quantity of the yarn produced.

Figure 1 is a perspective view of a portion of a mule-head, showing the driving-shaft, the driving-pulleys, the loose pulley, the weight operating the belt-shipper, and the extra friction-pulley with the brake. Fig. 2 is a top view of the brake mechanism secured to the mule-head. Fig. 3 is a side elevation, showing the position of the carriage and its connection with the brake mechanism. Fig. 4 shows the brake-pulley, the band-pulley, and the arrangement of the clutch by which the band-pulley imparts motion to the brake-pulley. Fig. 5 is a skeleton view of the means used to operate the weight *d*, the shipper actuating-rod, and weight, as also the cam, being shown in perspective. This forms no part of the invention, but illustrates how the cam *x*, by coming in contact with the arm *y*, draws down the rod *z* into the notch *z'*. A pawl enters when the weight *d* has reached the perpendicular position and the belt is on the loose pulley. This pawl cannot be withdrawn until the momentum of the driving-pulleys is stopped by the brake.

In the drawings, *a* represents the driving-shaft. *b b* are the driving-pulleys, both connected with the driving-shaft *a*, and arranged to be driven in opposite directions. *c* is a loose pulley, set between the driving-pulleys *b b*. *d* is the balance-weight, connected with the belt-shipper, and arranged to facilitate the reversing of the motion by its weight. *e* is a special pulley placed on the driving-shaft, for the purpose of forming a brake-surface. This pulley *e* is loose on the shaft *a*, and is connected with the band-pulley by means of a clutch. *f* is the band-pulley, secured to the end of the shaft *a*, by means of which the spindles in the carriage are driven, and, as it is provided with a clutch arranged to interfere with the clutch on the brake-pulley *e*, as shown in Fig. 4, it will be apparent that the band-pulley carries the brake-pulley with it, and that when the brake *g* is put on the brake-pulley, the band-pulley, shaft *a*, and the driving-pulleys must all stop, and also that the band-pulley can move about half a revolution backward, while the brake-pulley is firmly held, not being obstructed in that direction by the clutch. When, therefore, the carriage has reached its outward limit of movement, and the brake has stopped the momentum of the driving mechanism, the band-wheel turns part of a revolution backward, to allow of the fallers placing themselves in proper position to wind the yarn on the cop, and, as the carriage moves inward at that moment, the brake is released and the brake-pulley free to revolve with the band-pulley, causing no strain on any part of the mechanism, and releasing the brake without friction.

On the side of the mule-head the arm *h* is secured, and from its upper end the lever *h'* is suspended. On the lower arm of the lever an adjustable stop-pin is placed, against which the pin *i*, secured to the carriage, acts when the carriage approaches the end of its outward movement; and by means of the rod *k*, hinged on the swinging lever, the brake *g* is brought in contact with the brake-pulley *e*, and the momentum of the driving-shaft instantly arrested, and the weight *d* allowed to operate the shipper.

k^1 k^1 are collars, and k^2 a coiled spring, arranged to give some elasticity to the brake, and connect the same with the rod *k*.

On the end of the mule-head a spring-pressed hinged catch, *l*, is secured, arranged to hold

the weight and keep it from rising before the carriage has quite reached the limit of its outward run, as such rising allows the belts to ship and endangers the working of the machine. This catch *l* is connected with the rod *k*, and operated through the same by the carriage, so that the first strain of the carriage on the lever releases the catch *l*, and allows the weight *d* to rise, and as soon as the carriage has reached its outer run the brake arrests the momentum of the driving mechanism and allows the weight *d* to move the belt-shipper.

In mules as heretofore constructed, and particularly the kind of mules known as the "Mason mule," the shipper cannot be moved until the momentum of the driving mechanism is arrested, and therefore a portion of time is lost at each reciprocation.

A mule spinning-frame provided with our improved brake mechanism will operate as follows: When, at each outward run, the stop *i* of the carriage comes in contact with the adjustable pin at the lower end of the lever *h'*, the catch *l* releases the weight *d*, the brake *g* is brought in contact with the loose brake-pulley *e*, and the momentum of the driving mechanism is instantly arrested. The band-wheel *f* now makes a portion of a revolution—usually from one-fourth to one-third—backward from the clutch on the brake-pulley, to unwind the yarn from the spindle, and allow of the fallers placing themselves in proper position to wind the yarn on the cop. The carriage, now moving inward, releases the lever-arm, and through it the brake, until the same is put on again by the next outward motion of the carriage.

By thus arresting the momentum, the time heretofore lost—usually about one-seventh of the whole time—is now gained, and one-seventh more yarn produced on the same mule, at the same speed, and with the same attendance.

As the time heretofore lost in the so-called "standing twist" is now utilized in spinning and winding, this amount of twist is added while spinning to produce the same yarn. By this arrangement not only is the product of the mule increased, but the mechanism of the mule-head can be simplified, as a number of parts can now be dispensed with, and the shipper mechanism operated by simple means.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination, with the carriage and belt-shipper, of the driving-shaft, provided with the loose pulley *e*, band-wheel *f*, brake *g*, and clutches to connect said pulley and wheel, whereby the motion of the driving-shaft is instantly arrested, and the band-wheel allowed part of a backward revolution independent of the pulley, substantially as described.

2. The combination, with the belt-shifter and driving-shaft, the latter provided with the loose pulley *e*, band-wheel *f*, and brake *g*, of the rod *k*, swinging lever *h'*, and carriage provided with a stud, *i*, substantially as described.

3. The driving-shaft *a*, loose pulley *e*, band-wheel *f*, and clutches connecting said pulley and wheel, in combination with the brake *g*, rod *k*, spring-pressed lever *l*, and weight connected with the belt-shifter, and swinging lever *h'*, the latter adapted to be operated by the carriage, substantially as described.

In testimony that we claim the foregoing as our own invention we affix our signatures in presence of two witnesses.

ANGELO HOWLAND.
HAROLD LAWTON.

Witnesses:
JOSEPH A. MILLER,
JOSEPH A. MILLER, Jr.