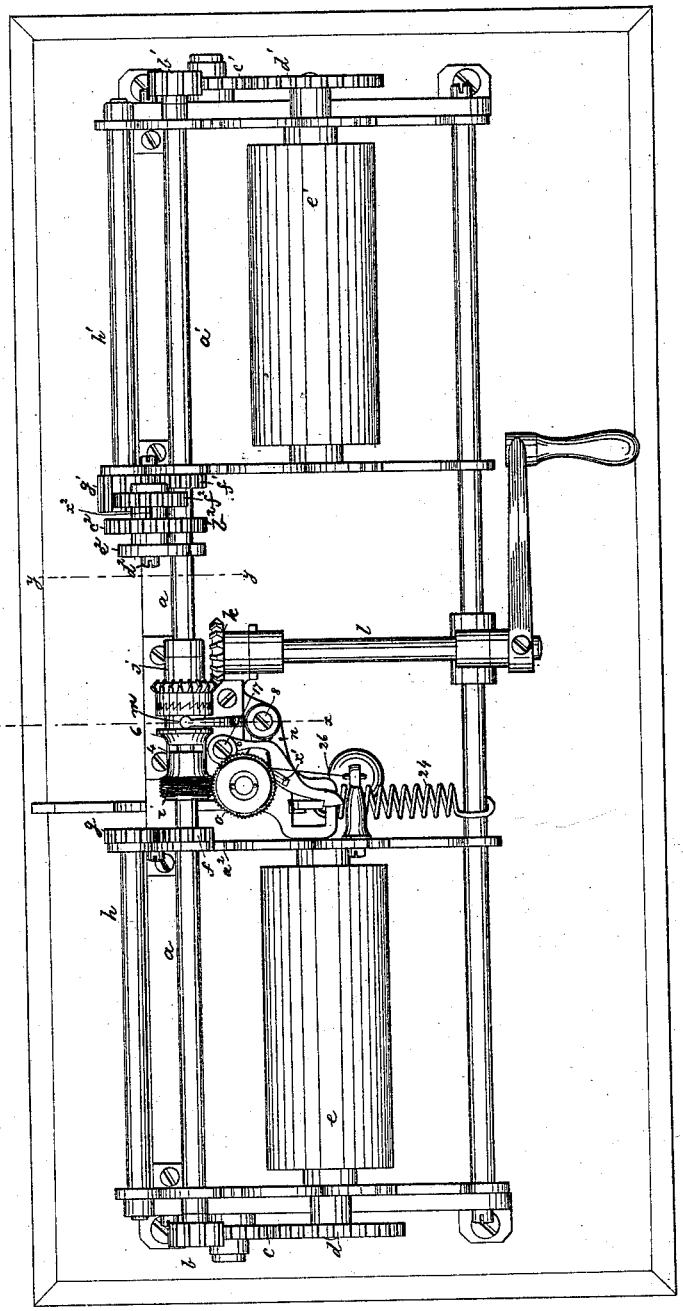
2 Sheets—Sheet 1.

E. A. BALDWIN.

Art of Spinning Yarn on Spinning-Mules.

No. 209,318. **Patented Oct. 29, 1878.**

Fig. 1.



Witnesses.

N. S. Whitney.

L. F. Connor.

Inventor.

Eben. A. Baldwin.

by Crosby & Gregory, Attys

2 Sheets—Sheet 2.

E. A. BALDWIN.

Art of Spinning Yarn on Spinning-Mules.

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Fig. 2.

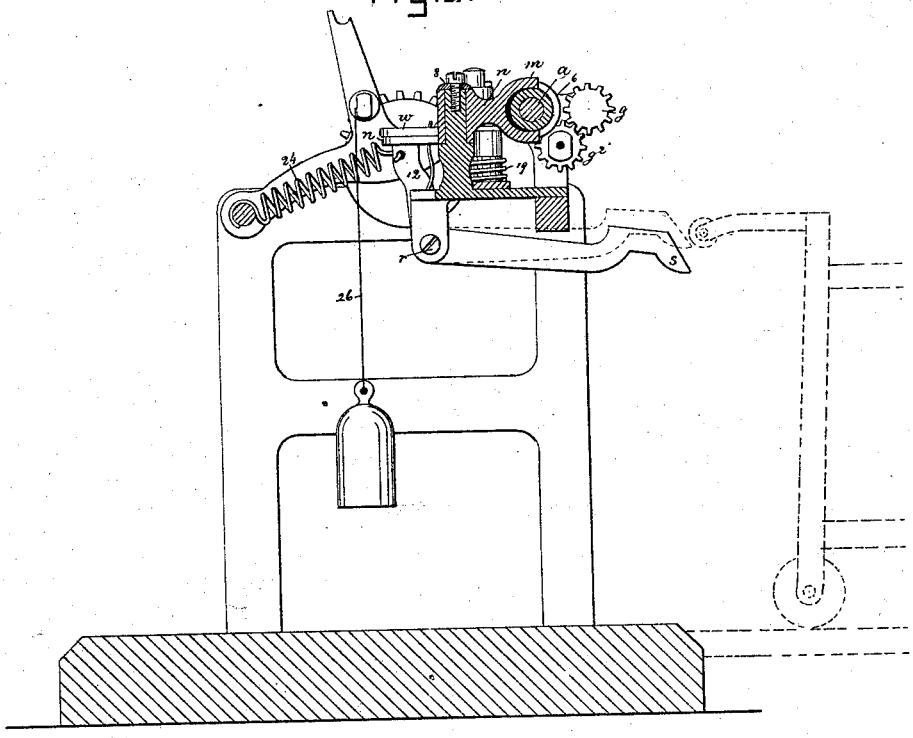


Fig. 3.

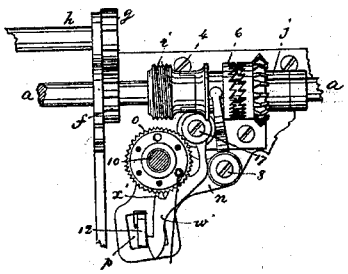


Fig. 5.

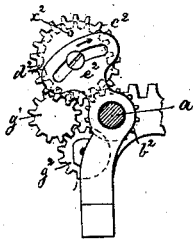
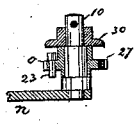


Fig. 4.



Witnesses

N. E. Whitney.

L. F. Connor

Inventor.

Eben. A. Baldwin

by Crosby Gregory Attys

UNITED STATES PATENT OFFICE.

EBEN A. BALDWIN, OF NORTH ANDOVER, MASSACHUSETTS, ASSIGNOR TO GEO. L. DAVIS, JOHN A. WILEY, JOS. M. STONE, GEO. G. DAVIS, JOSEPH H. STONE, AND JAMES H. DAVIS.

IMPROVEMENT IN THE ART OF SPINNING YARN ON SPINNING-MULES.

Specification forming part of Letters Patent No. **209,318**, dated October 29, 1878; application filed July 20, 1878.

To all whom it may concern:

Be it known that I, EBEN A. BALDWIN, of North Andover, county of Essex, State of Massachusetts, have invented an Improvement in the Art of Spinning Yarn on Spinning-Mules, of which the following description, in connection with the drawings forming a part thereof, is a specification.

This invention relates to an improvement in the art or method of spinning yarn on spinning-mules having two independent sets of delivery-rollers, to permit rovings of different weight and size to be spun thereon at the same time, and produce yarns of equal weight and size, which consists in delivering the rovings by one of said sets of rollers at a greater rate of speed than by the other set, substantially as hereinafter described.

The mule-head stock has two independent sets of delivery-rollers, which are operated at different speeds, the rolls delivering the rovings of least weight being run faster than the rolls which deliver the rovings of greatest weight, whereby the rovings of greatest weight are stretched during the outward movement of the carriage more than are the rovings of least weight, and the yarns or threads spun from said rovings of different weights are made of equal weight and size.

In another application filed in the United States Patent Office concurrently with this I have shown how this result can be accomplished by stopping one portion or set of the rolls in advance of other portions or sets.

In this present invention I have connected the delivering-rollers at one side of the head-stock with those at the other side by means of a speed-changing or compound gear, which will drive the portions of the delivering-rollers with which it is in driving connection at either a greater or less speed than the other portions of the feed-rollers or the other set of rollers of the same head-stock.

This invention is an improvement upon the McGovern mule described in United States Letters Patent No. 193,877, August 7, 1877, to which reference may be had.

Figure 1 represents, in top view, a sufficient portion of a woolen-mule to, in connection with this specification, enable one conversant with mules to practice my invention. In the said figure the top rolls are removed. Fig. 2, a section on the line $x\ x$, Fig. 1; Figs. 3 and 4, details to be referred to; and Fig. 5, a side elevation of the compound or speed-changing gear, looking at it from the section-line $y\ y$, Fig. 1.

In this my invention I have used the same letters to designate parts like those referred to in my other application.

The delivering-roller a, at the right-hand side of the mule as the operator stands to spin, has a pinion, b, which, through a side wheel, c, moves the pinion d on the roving-drum e. At or near the frame part a^2 this roller a has a pinion, f, which engages an idle-wheel, g^2, and turns a pinion, g, at the end of the front roller, h. This roller a has fixed to it a worm, i, notched to receive prongs 4 on a clutch, 6, fitted to slide on the shaft a under the action of a lever, n, pivoted at 8 and forked at m to embrace the clutch, it being adapted to be thrown into engagement with the loose sleeve j, positively rotated by means of the bevel-pinion k on shaft l, or by any other suitable or well-known devices, the sleeve having teeth at one side to engage corresponding teeth of the clutch, and rotate the rollers a and h with it. Farther along on this roller a is a fixed pinion, b^2, which engages the gear-wheel c^2, supported on the adjustable stud d^2 in the stand e^2, the same stud also carrying a gear-wheel, f^2, of different diameter, (see Fig. 1 and dotted lines, Fig. 5,) which is connected and moves with the gear-wheel c^2, the said gear-wheels constituting a compound or changing-speed gear.

The gear f^2 meshes into the pinion g^1 on the roller-shaft h', the pinion g^1 into an idle-wheel like g^2, and the said idle-wheel engages a pinion, f^1, on the roller-shaft a^1, which shaft is in turn provided with a pinion, b^1, which, through an idle-wheel, c^1, actuates the toothed wheel d^1 on the shaft of the roving-drum e^1.

The two gears $c^2\ f^2$, being of different diameters and on the same stud, are enabled the

one to be actuated at one speed and cause the other to actuate at another speed the pinion with which it is in gear.

As shown in the drawings, the gear c^2 is driven from the shaft of roller a, and the gear f^2 is made to drive the shaft of roller a^1, in line with it or the set of rollers at that end of the head-stock, at an increased speed, whereby the smaller rovings or those of least weight placed at that end of the head-stock on drum e^1 will be delivered faster than the larger or heavier rovings delivered by the set of rolls a h at the opposite end of the head-stock. Instead of this particular compound gear, it is obvious that I may employ any other well-known form of gear which will change the rates of speed of connected shafts.

In this specification, so far described, provision has been made to rotate the set of rolls a^1 h' at a faster speed than the set of rolls a h; but it is obvious if the spools containing the smaller rovings were placed on the drum e, and the spools containing the larger or heavier rovings on the drum e^1, that the compound gear would have to be changed, so as to run the rolls a^1 h' the slowest, which would be accomplished in the following manner, viz: The stud d^2 would be loosened and moved in the direction of the arrow, Fig. 5, and the gear f^2 would be changed for a gear just like it, except as to diameter, the said substituted gear being of greater diameter than gear c^2.

The lever n, pivoted on stud 8 and provided with an opening or notch, p, to receive the arm 12, connected with the rocker-shaft r, carries a stud, 10, on which is mounted a clock, o, or contrivance which acts to regulate the duration of movement of the delivering-rollers, the said clock being provided with a time-pin, 23, which, during the rotation of the clock, its teeth being in engagement with the rotating worm i, as shown in Fig. 1, will act upon a projection, x', attached to the catch w, and will move the said catch so as to release the arm 12, permit the spring 24 to turn the arm 12 so as to operate the lever n, move the clutch 6 from engagement with the teeth of the sleeve j, and thereby stop at the desired time the rotation of the shaft a of the set of delivering-rollers a h. This movement of the lever disengages the clock from the worm i, and the weighted cord 26 returns the clock to its normal or starting position, ready to be again moved when the clutch 6 is engaged with the sleeve to start the delivering-rollers as the carriage again runs out. The arm s connected with the rock-shaft is struck by a roller on or by the carriage, as shown in dotted lines, Fig. 2, when the latter in its inward run reaches the said arm, thereby rocking the shaft r, and causing its arm 12 to be moved to operate the lever n, engage the clutch 6, and set the rollers in motion.

A spring, 19, (see Fig. 2,) on stud 17 acts to move the catch w to engage the arm 12.

The gear f^2 has a pin, x^2, which enters a hole in gear c^2, so that gear c^2 moves the gear f^2.

I claim—

That improvement in the art of spinning yarn on spinning-mules having two independent sets of delivery-rollers, to permit rovings of different weight and size to be spun thereon at the same time and produce yarns of equal weight and size, which consists in delivering the rovings by one of said sets of rollers at a greater rate of speed than by the other set, substantially as herein specified.

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

EBEN A. BALDWIN.

Witnesses:

J. LEONARD TATTERSALL,

DAVID HALLIDAY.