No. 49,869. PATENTED SEPT. 12, 1865.

A. G. CUMNOCK.

SELF ACTING MULE.

Fig. 1.

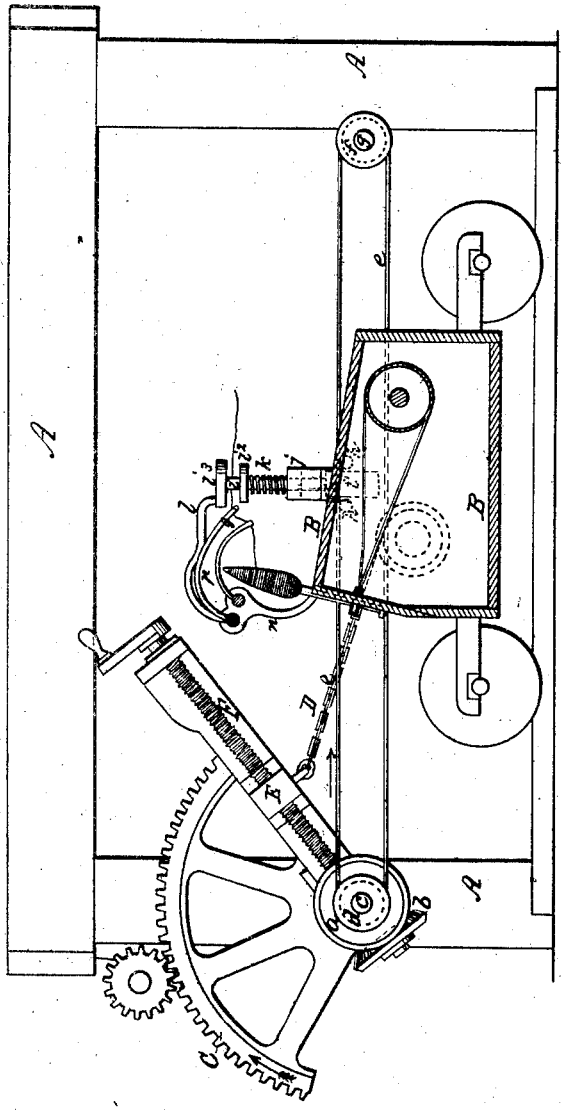


Fig. 3.

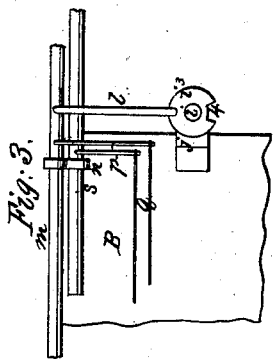
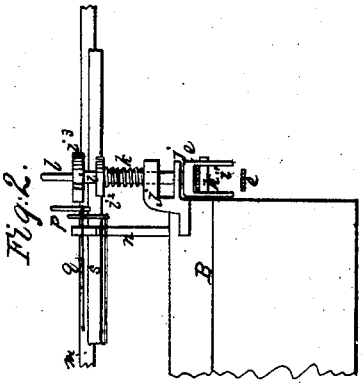


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

ALEXANDER G. CUMNOCK, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN SELF-ACTING MULES.

Specification forming part of Letters Patent No. **49,860**, dated September 12, 1865.

To all whom it may concern:

Be it known that I, ALEXANDER G. CUMNOCK, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Self-Acting Mules for Spinning; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation partly in section, of portions of the head and carriage of a self-acting mule illustrating my invention. Fig. 2 is a back view of a portion of the same. Fig. 3 is a plan view corresponding with Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in an improvement in the tension-regulator applied to a self-acting mule for regulating the tension of the yarn in the operation of winding it onto the cops on the spindles, whereby I dispense with the use of a loaded lever such as is employed in the tension regulators most in use, such lever being objectionable on account of its weight sometimes pressing and at other times not pressing on the yarn, and causing the regulator to work by jerks instead of in a uniform manner.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the framing of the mule-head.

B is the carriage.

C is the quadrant-gear by which the movement of the spindles is governed in winding the yarn upon the cops as the carriage runs in. This quadrant-gear may be driven in any known or suitable manner, and is connected with the mechanism for driving the spindles by means of the chain D, commonly employed, the said chain acting upon the spindle-driving shaft through any suitable system of shafting, drums, and gearing, and being connected with the quadrant by means of a slide, *e*, which is movable toward and from the center of the quadrant-gear to vary the amount of movement given to the chain during a given amount of movement of the quadrant-gear about its axis. The movement of the slide E is effected in the common way by a screw, F, which is arranged radially to the axis of the quadrant in bearings thereto attached, and which is free to turn but not to move longitudinally.

Secured to the end of the screw F, next the axis of the quadrant-gear, there is a bevel-gear, *b*, which gears with a bevel-gear, *a*, turning loosely on a stud, *c*, which is attached to the quadrant-gear in line with the axis thereof. The bevel-gear *a* has firmly secured to it a pulley, *d*, for the reception of an endless belt *e*, which extends the whole length of the mule-head, and which also runs around a pulley, *f*, turning freely on a fixed stud, *g*, attached to the frame of the mule-head near the rear thereof. This belt is parallel with the movement of the carriage, and its upper leaf runs over two horizontal pins, *h h*, attached rigidly to the carriage and through a fork, i', at the lower end of an upright rod *i* running through guides *j j* attached to the carriage. The fork i' is arranged to pass between the pins *h h*. The rod *i* has provided on it above the upper guide *j* a collar, i^2, between which and the said guide there is applied a spiral spring, *k*, which, when the said rod is not depressed, as hereinafter described, in consequence of the excessive tension of the yarn in winding on, holds up the said rod and its fork so high (as shown in Figs. 1 and 2) that the belt *e* passes freely through it and over the pins *h h* without being interfered with by the movement of the carriage.

On the top of the rod *i* there is a disk or broad circular head, i^3, which is situated below the extremity of an arm, *l*, which is attached rigidly to the horizontal rock-shaft *m*, which extends the whole length of the mule-carriage, on which it is supported in bearings in standards *n*, which contain the bearings of the faller-shaft *s*. This shaft *m* is furnished with arms *p p*, to which are attached horizontal wires *q*, extending the length of the entire row of spindles on either side of the mule-head, in such manner that the yarn presses upon the said wires.

The spring K is of such strength that while the tension of the yarns in winding on is not excessive, the aggregate pressure of all the yarns upon the wires *q*, pressing the arm *l* down upon the dish i^3, will not overcome the upward resistance of the spring *k*, or at least not so far overcome it as to cause the fork to press hard upon the belt *e*, which then remains stationary. But when the tension becomes greater than is desirable the pressure of the yarns upon the wires cause the arm *l* to depress the fork between the pins *h h*, and so clamp the belt in such man-

ner that the carriage in running up will give motion to the belt in the direction of the arrow shown near it in Fig. 1. The belt will thus produce such a rotary motion of the pulley *d* and bevel-gears *a b* as will turn the screw F in a direction to move the slide E, with which the chain D is connected, outward from the center of the quadrant, and as the screw is always inclined more or less toward the carriage this movement of the slide E slackens the chains D and so reduces the velocity of revolution of the spindles until the tension of the yarn is sufficiently reduced, when the spring *k* lifts up the fork *i'*, and so leaves the belt *e* free of the carriage and stationary.

In order to permit the wires *q* to be depressed when it becomes necessary to doff the cops or bobbins from the spindles, the disk i^3 is fitted to the top of the pin *i* in such manner that it may be easily turned with the thumb and finger, and a notch, 4, is provided in the said disk.

When it is desired to doff the cops or bobbins the disk is turned to bring the notch 4 under the point of the arm *l*, so that the said arm may drop through the said notch and permit the descent of the arms *p p*, to which the wires *q q* are attached.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the rod *i*, spring *k*, arm *l*, and the fork *i'*, and pins *h h*, or other equivalent clamping device, the whole applied, in combination with the mule-carriage and the belt *e*, to operate substantially as and for the purpose herein specified.

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Witnesses:
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