(No Model.) 2 Sheets—Sheet 1.

E. H. GILBERT & T. H. GREENWOOD.

FEED WINDING REGULATOR FOR SPINNING MULES.

No. 271,447. Patented Jan. 30, 1883.

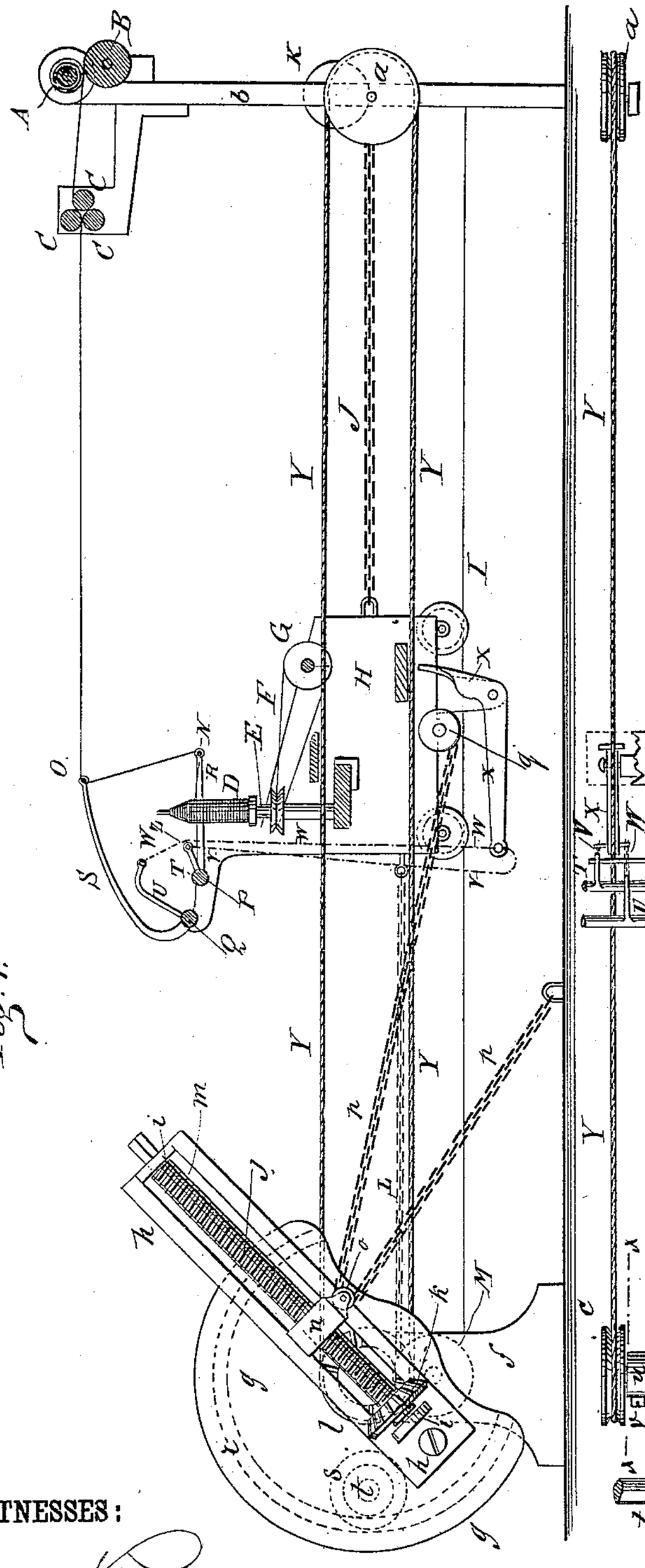

Fig: 1.

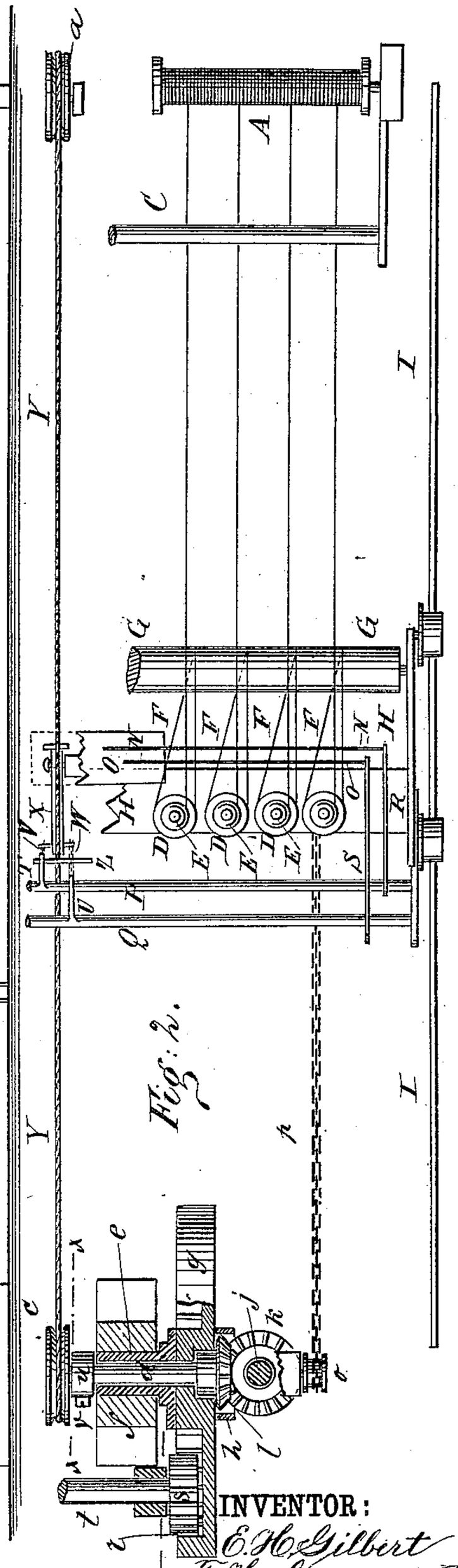

Fig: 2.

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(No Model.) 2 Sheets—Sheet 2.

E. H. GILBERT & T. H. GREENWOOD.

FEED WINDING REGULATOR FOR SPINNING MULES.

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Fig: 3.

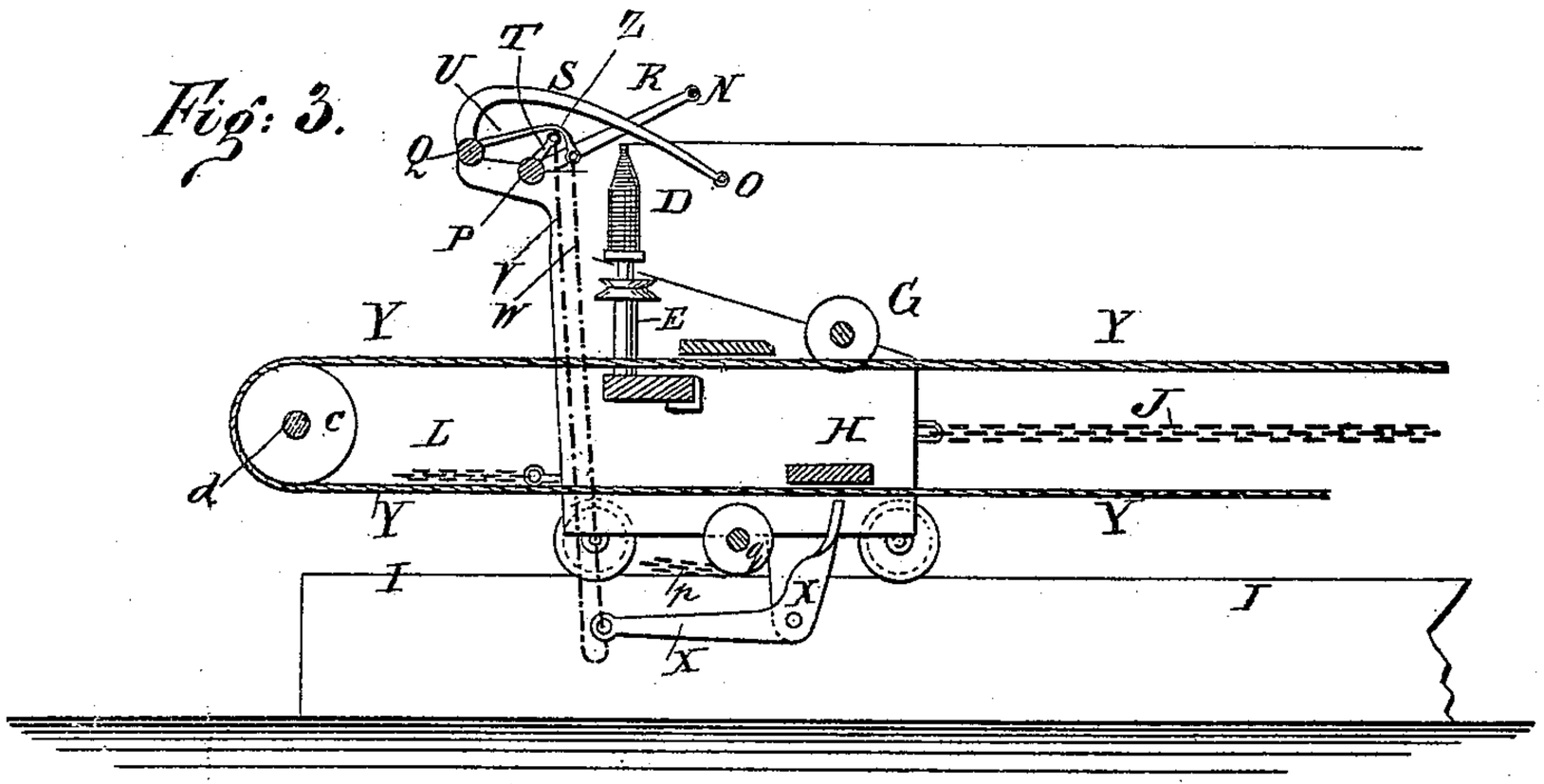


Fig: 4.

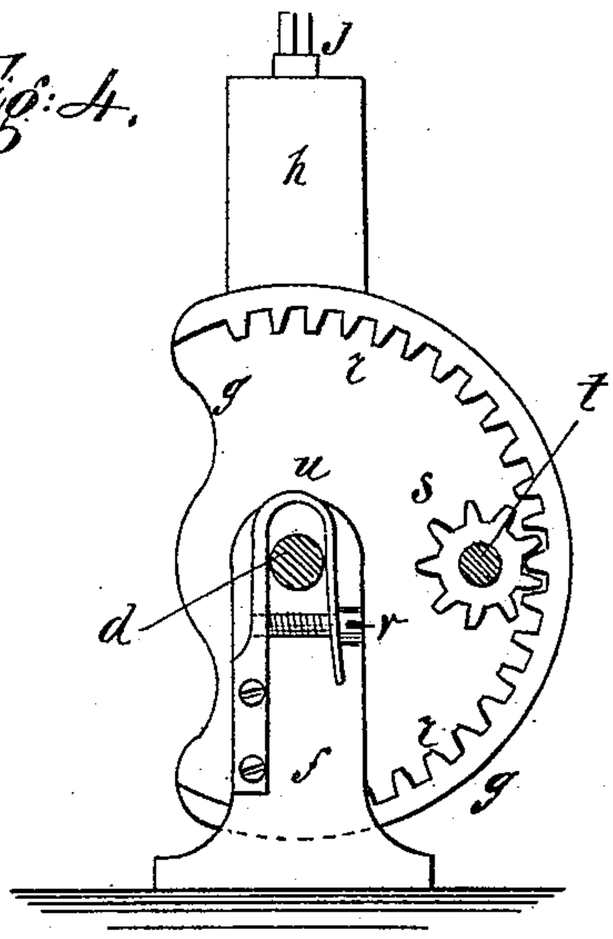


Fig: 5.

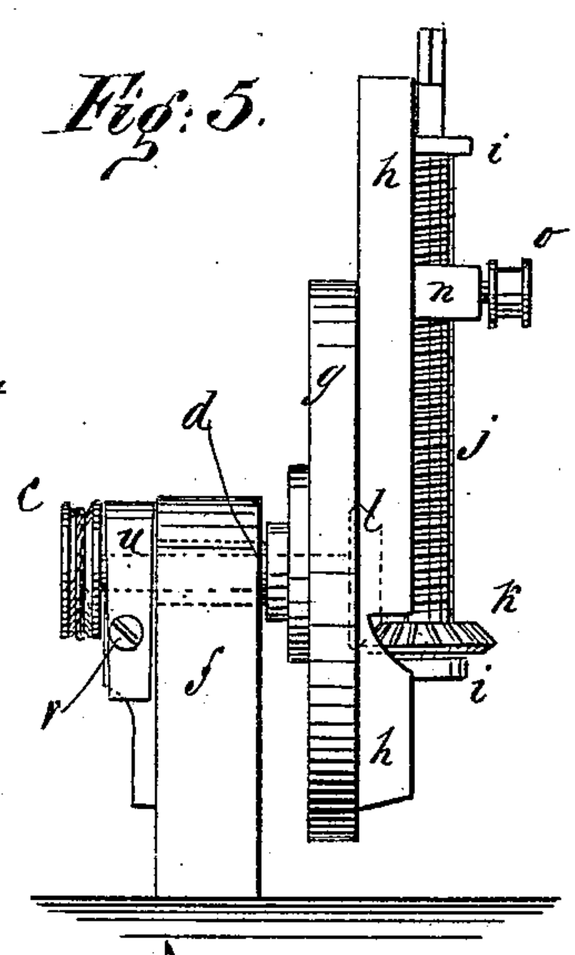


Fig: 6.

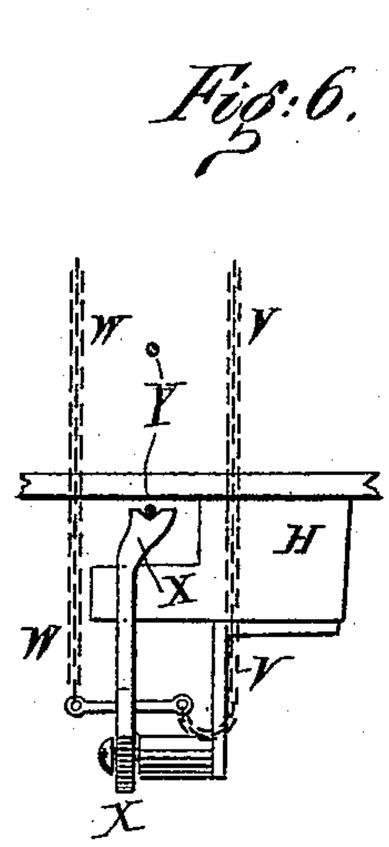
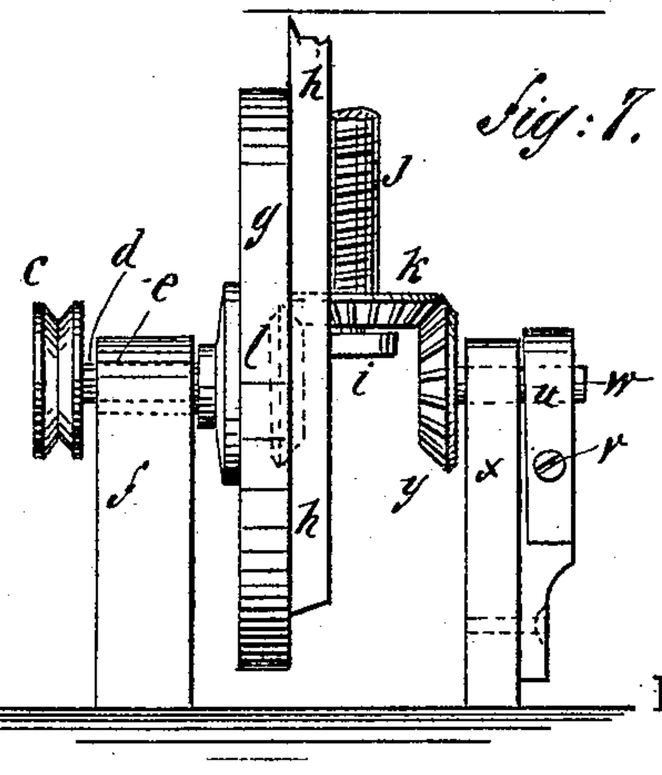


Fig: 7.



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UNITED STATES PATENT OFFICE.

EDWARD H. GILBERT, OF WARE, AND THOMAS H. GREENWOOD, OF HARDWICK, MASSACHUSETTS.

FEED WINDING REGULATOR FOR SPINNING-MULES.

SPECIFICATION forming part of Letters Patent No. 271,447, dated January 30, 1883.

Application filed June 15, 1882. (No model.)

To all whom it may concern:

Be it known that we, EDWARD H. GILBERT, of Ware, in the county of Hampshire and State of Massachusetts, and THOMAS HENRY GREENWOOD, of Hardwick, (Gilbertville P. O.,) in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Feed Winding Regulators for Spinning-Mules, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, Sheet 1, is a sectional side elevation of a part of a spinning-mule to which our improvements have been applied, the carriage being represented as moving inward. Fig. 2, Sheet 1, is a plan view, partly in section, of a part of the same. Fig. 3, Sheet 2, is a side elevation, partly in section, of a part of the same, the carriage being represented as moving outward. Fig. 4, Sheet 2, is a rear elevation of the quadrant, partly in section, through the line *x x x*, Fig. 2. Fig. 5, Sheet 2, is a side elevation of the quadrant. Fig. 6, Sheet 2, is a rear elevation of the latch and its connections. Fig. 7, Sheet 2, is a side elevation of the quadrant, showing a modification.

The object of this invention is to keep an even tension upon the thread, and thus make thread of a uniform quality, and prevent "breakdowns" of the thread and the consequent waste of material.

The invention consists in the construction and combination of parts hereinafter fully described and claimed.

A is the spool that carries the roving, and B is its drum.

C are the parallel rollers, between which the roving passes to the bobbins D.

E are the bobbin-carrying spindles, which receive motion by the bands F from the cylinder G, which is driven by the ordinary mechanism.

H is the carriage, which is moved outward and inward upon the track I.

J is a chain, one end of which is attached to the carriage H and its other end is attached to the drum K, so that the carriage H will be drawn inward by the winding of the said chain upon the said drum.

L is a chain, one end of which is attached to the carriage H and its other end is attached to the drum M, so that the said carriage will be drawn outward by the winding of the said chain upon the said drum. The drums K and M are driven by the ordinary mechanism, about the construction of which there is nothing new. As the carriage H is moving outward the roving is drawn into a thread and twisted, and as the carriage is moving inward the thread is laid or wound upon the bobbin D.

N is the faller under which the thread passes, and O is the counter-faller over which the said thread passes. The fallers N O are connected with the shafts P Q, respectively, by the arms R S, and are controlled and operated by the ordinary mechanism. When the thread is being drawn and twisted, the faller N is raised and the counter-faller O is lowered, as shown in Fig. 3, so that the thread will pass directly to the bobbin D. When the thread is being wound upon the bobbin, the faller N is lowered and the counter-faller O is raised, as shown in Fig. 1.

To the shafts P Q are attached, respectively, short arms T U, to the outer ends of which are attached the upper ends of two short chains, V W. The chains V W are entirely independent of each other, and their lower ends are attached to the end of the latch X, which is made in the form of a bent bar, and is pivoted at its angle to the carriage H in such a position that its engaging end will clamp the lower half of the endless rope Y against the part of the carriage beneath which the said lower half passes, so that when the latch X is left free it will be held against the rope Y by its own weight, and will cause the carriage H in its inward movement to carry the said rope Y with it. As the carriage H moves outward the latch X slides along the rope Y without clamping it. With this construction the upward movement of either the faller N or the counter-faller O will withdraw the latch X from the rope Y, as shown in Figs. 1 and 6; but if the strain upon the thread should become too great the latch X will be released and allowed to clamp the rope Y, the movement of which will lessen

the strain upon the thread, as will be hereinafter described.

To the arm T is attached a cross-bar, Z, which, as the said arm T is raised, strikes against the chain W and takes up a part of its slack, so that a lesser movement of the chain W will withdraw the latch X from the rope Y. The endless rope Y passes around a pulley, *a*, pivoted to the frame *b*, and also around a pulley, *c*, attached to the end of the shaft *d*. The shaft *d* passes through and revolves in a sleeve, *e*, which revolves in bearings in the standard or bracket *f*, attached to the floor of the room or to the frame of the machine.

To the outer end of the sleeve *e* is attached the ordinary quadrant *g*, to the outer side of which is attached a bar, *h*, provided at its upper and lower ends with lugs *i*.

To the lugs *i* are swiveled the ends of a screw, *j*, to the lower part of which is attached a small beveled-gear wheel, *k*. The teeth of the beveled-gear wheel *k* mesh into the teeth of the small beveled-gear wheel *l*, attached to the end of the shaft *d*, so that the screw *j* will be turned by the revolution of the said shaft *d*.

In the outer side of the bar *h* is formed a longitudinal groove, *m*, to receive the end of a nut, *n*, placed upon the screw *j*, so that the nut *n* cannot be turned by turning the screw *j*, but will be moved up and down as the said screw is turned forward and back.

To lugs formed upon the nut *n* is pivoted a pulley, *o*, around which passes a chain, *p*. One end of the chain *p* is attached to the floor of the room or to the frame of the machine, and its other end is attached to a drum, *q*, connected with the carriage H in the ordinary manner and operated by the ordinary mechanism. The chain *p* in its office of winding causes a tension of the threads, and when the said tension becomes too great the latch X clamps the rope Y and causes the said rope to turn the shaft *d*, which turns the screw *j* and causes the nut *n* to move up the said screw, and thus slacken the chain *p* and lessen the tension on the threads. The upper end of the screw *j* projects above the upper end of the bar *h*, and is squared to receive a crank or key, so that the said screw can be turned by hand to run the nut *n* down when required.

To the curved edge of the quadrant *g* is attached a segment of an internally-toothed gear-wheel, *r*, into the teeth of which mesh the teeth of the small gear-wheel *s*, attached to the shaft *t*, which revolves in bearings attached to the standard *f* or other suitable support, and is driven by the ordinary mechanism to swing the quadrant *g* forward and back as the carriage H moves inward and outward.

u is a friction-spring, which is bent into U shape, and its bend is passed over the shaft *d*, between the pulley *c* and the standard *f*. One end of the spring *u* is attached to the standard *f*, and its other or movable end is connected with the first or stationary end by a clamping-screw, *v*, so that the said spring can be adjusted to cause more or less friction upon the shaft *d*, as may be required. With this construction, when the carriage H is moving inward and the quadrant *g* is swinging forward, the chain *p* is taut and exerts a great strain upon the nut *n*, so that the friction of the nut *n* upon the screw *j* will be greater than the friction between the shaft *d* and the spring *u*, and the said shaft *d* will be turned by the movement of the quadrant, while the screw *j* and nut *n* will remain stationary. When the carriage H is moving outward and the quadrant *g* is swinging backward, the chain *p* is slack, so that the friction between the shaft *d* and spring *u* will hold the said shaft *d* stationary, and the movement of the quadrant will turn the screw *j* backward, running the nut *n* downward, and increasing the tension upon the threads automatically, when being wound up on the inward run of the carriage, the gear-wheel of the shaft, to which the friction-spring *u* is attached, acting as a fulcrum or resisting point to the gear-wheel *k*, attached to the screw *j*, and causing the said screw to turn backward. In the ordinary arrangement of the quadrant, where the gear-wheel of the screw *j* meshes into the upper teeth of the gear-wheel *l*, the backward movement of the screw *j* can be obtained by applying the friction-spring *u* to a shaft, *w*, revolving in bearings attached to a standard, *x*, or other suitable support.

To the inner end of the shaft *w* is attached a beveled-gear wheel, *y*, the teeth of the upper part of which mesh into the teeth of the gear-wheel *k*, attached to the screw *j*, as illustrated in Fig. 7.

The drawings illustrating this invention are based on what is shown, for instance, in the McGovern mule, patented May 6, 1873, No. 138,511; but the invention is applicable to any kind of mule having the quadrant motion, slight modifications in form and in size or position of gears being all that is necessary to adapt it to them.

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

The mule-carriage and the drum carried by it, the quadrant *g*, provided with sleeve *e*, the bracket *f*, supporting the same, the screw *j*, journaled in said quadrant and having a beveled gear, *k*, secured upon it, the nut *n*, carrying a pulley, *o*, upon said screw, and the chain *p*, hung as described, in combination with the shaft *d*, provided with a pulley, C, and beveled gear *l*, the cord Y, and means for operating the same, substantially as specified, and the friction-spring *u*, secured to bracket *f*, to operate upon shaft *d*, as described, whereby the backward motion of the quadrant will operate to return the nut *n*.

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THOMAS H. GREENWOOD.

Witnesses:
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