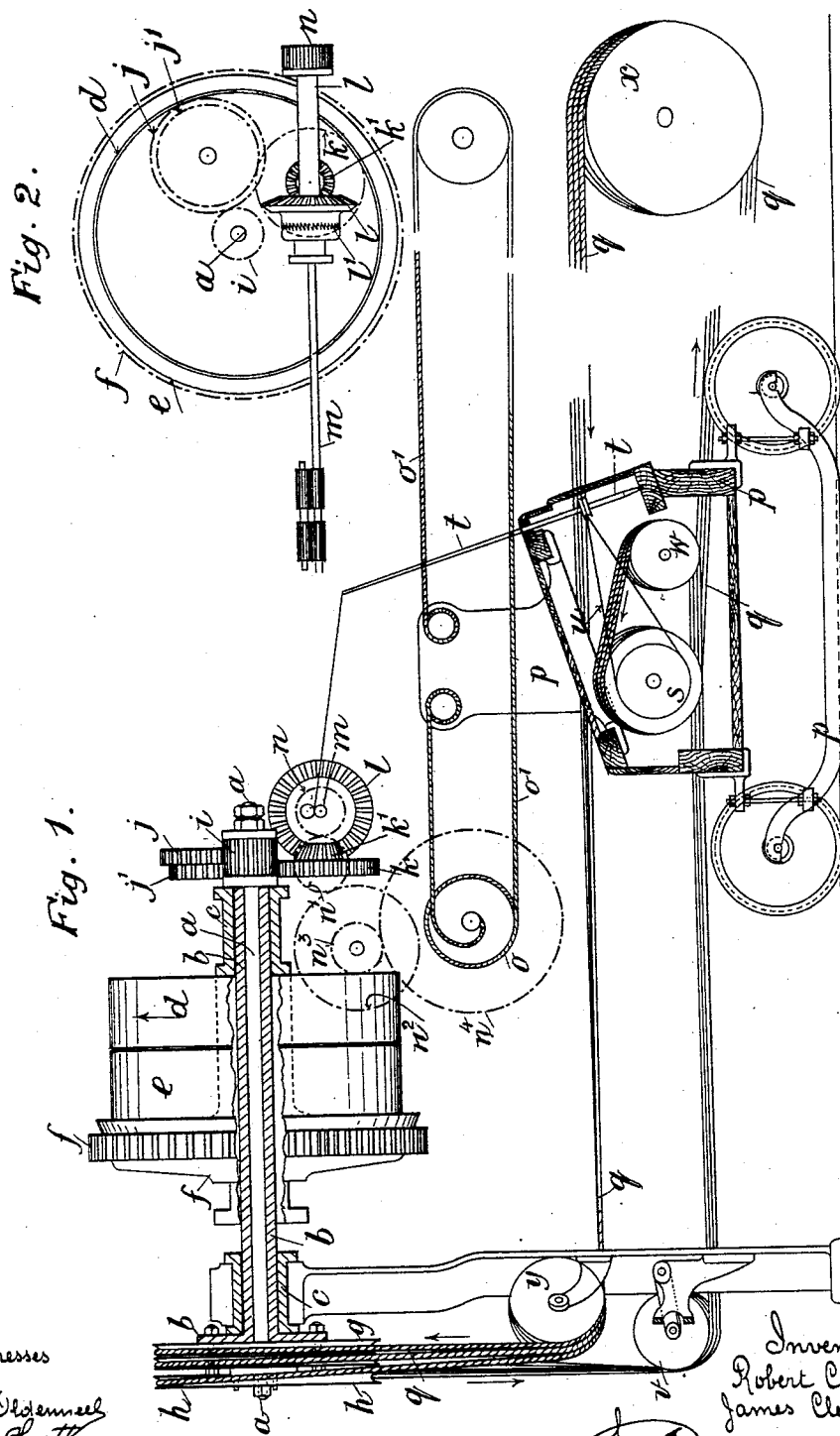


(No Model.)

R. & J. CLEGG.
SELF ACTING MULE.

No. 580,038.

Patented Apr. 6, 1897.



UNITED STATES PATENT OFFICE.

ROBERT CLEGG AND JAMES CLEGG, OF OLDHAM, ENGLAND.

SELF-ACTING MULE.

SPECIFICATION forming part of Letters Patent No. 580,038, dated April 6, 1897.

Application filed November 26, 1895. Serial No. 570,219. (No model.) Patented in England July 2, 1895, No. 12,707.

To all whom it may concern:

Be it known that we, ROBERT CLEGG and JAMES CLEGG, subjects of the Queen of Great Britain, residing at Oldham, in the county of Lancaster, England, have invented certain new and useful Improvements in Self-Acting Mules, (for which we have obtained Letters Patent in Great Britain, numbered 12,707, bearing date July 2, 1895,) of which the following is a specification.

Our invention relates to improvements in the driving mechanism of self-acting mules; and the object of our improvements is to insure an accurate and constant amount of twist in the yarn being spun at all stages of the outward run of the carriage, notwithstanding the slipping of the rim-band, which takes place at every stretch. We accomplish this object by driving the usual changeable rim-pinion secured upon the rim-shaft from the rim-band, which drives the tin-roller shaft substantially in the manner hereinafter described and as pointed out in the claims.

In the accompanying drawings, Figure 1 is a diagrammatic representation of part of a mule, showing the rim-shaft and the carriage and the mechanism for driving the drawing-rollers, carriage, and spindles from the rim-band; and Fig. 2 is a detail of the gearing for driving the drawing-rollers from the rim-pinion.

On the rim-shaft *a* is mounted a loose bush or sleeve *b*, which is supported in bearings *c*, and on this sleeve *b* the following parts are mounted: a loose pulley *d*, a fast or driving pulley *e*, with a friction-cone, as usual, the backing-off wheel *f*, and a rim-band pulley *g*, preferably with two grooves, fixed on the sleeve. The backing-off wheel *f* is made, as usual, with a hollow friction-cone to fit over the cone on the pulley *e*, and is fitted to slide freely on the sleeve *b*. We have shown only a single driving-pulley *e* and one loose pulley *d* on the sleeve *b*, but it is obvious that these might be duplicated for double driving.

On one end of the rim-shaft *a* is fixed the changeable rim-pinion *i*, which drives, by the train of gears *j j' k k' l* and clutch *l'*, the drawing-roller shaft *m*. On the long boss of the clutch-wheel *l* is fixed the pinion *n*, from which motion is transmitted by a train of gears *n' n² n³ n⁴* to the scroll *o*, which by a

band *o'* actuates the mule-carriage *p*. On the other end of the rim-shaft *a* is fixed a changeable rim-pulley *h*, preferably single-grooved, and the rim-band *q* passes over all the three grooves in the rim-pulleys *g* and *h* and over the usual grooved carrier and tightening-pulleys, and so gives motion to the tin-roller shaft *s*, from which the spindles *t* are driven by bands *u*, as usual.

In putting on the rim-band *q* we should start, say, from the groove on the rim-pulley *h*, down to the middle groove on the carrier-pulley *v*, to the middle groove on each of the following—the union-pulley *w*, the tin-roller-shaft pulley *s*, the tightening-pulley *x*, and the carrier-pulley *y*—and back to the outside groove on the pulley *g*, thence down to the inside groove on the pulley *v* and the inside grooves on the series of pulleys *w s x y*, back to the inside groove on the rim-pulley *g*, thence down to the outside groove on the pulley *v* and the outside grooves on the pulleys *w s x y*, and back to the groove on the rim-pulley *h*. It will thus be seen that when the driving-belt (not shown) is on the driving-pulley *e*, which is keyed on the loose sleeve *b*, or, in the case of double driving, when two driving-belts are on two driving-pulleys keyed on the sleeve *b*, the latter revolves, and with it the rim-band pulley *g*, which transmits motion by the rim-band *q* to the tin-roller shaft *s* and so to the spindles *t*, and as the rim-band *q* also runs over the second rim or single-grooved pulley *h*, which is fast on the rim-shaft *a*, the latter is rotated, and with it the rim-pinion *i*, which transmits its motion through the train of gearing to the drawing-roller shaft *m* and to the scroll *o*. Consequently the speed of the rim-shaft *a* is governed by the speed of the rim-band *q*, and the drawing-rollers and the carriage also receive a motion governed by the speed of the rim-band, and therefore are, like the spindles *t*, subject to any variation of speed caused by the slipping of the rim-band or any other cause which affects it.

It will be readily understood that various modifications and alterations in the details may be made without departing from the essential feature of our invention, which consists in so arranging the driving mechanism as to make the driving of the drawing-rollers

and the carriage secondary to and dependent upon the driving of the spindles—that is to say, we make the spindles lead, so that they cannot lag behind, but must start simultaneously with, or, if anything, slightly before, the drawing-rollers and carriage. It will therefore be obvious that this result could be accomplished with a single-grooved rim-pulley *g* and a double or two separate ropes instead of a triple rope *g*.

We do not wish to limit ourselves to the precise arrangement of the hollow sleeve *b* and the shaft *a* shown, as this may be modified without departing from the spirit of our claims.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim, and desire to secure by Letters Patent of the United States, is—

1. In combination with the tin-roller shaft and spindles, the drawing-rollers and mule-

carriage and driving connections extending first to the said tin-roller shaft and thence to said drawing-rollers and carriage whereby in the circuit of the driving connections, the movement of the spindles is primary and the driving of the rollers and carriage secondary, substantially as described.

2. In combination with the rim-shaft, the drawing-rollers and carriage with driving connections from said shaft to said parts, a driving-pulley, a rim-band pulley driven thereby, the roller-shaft and spindles, a rim-band driving the said roller-shaft, spindles, and the said rim-shaft from the rim-band pulley, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

ROBERT CLEGG.
JAMES CLEGG.

Witnesses:

H. B. BARLOW,
HERBERT R. ABBEY.