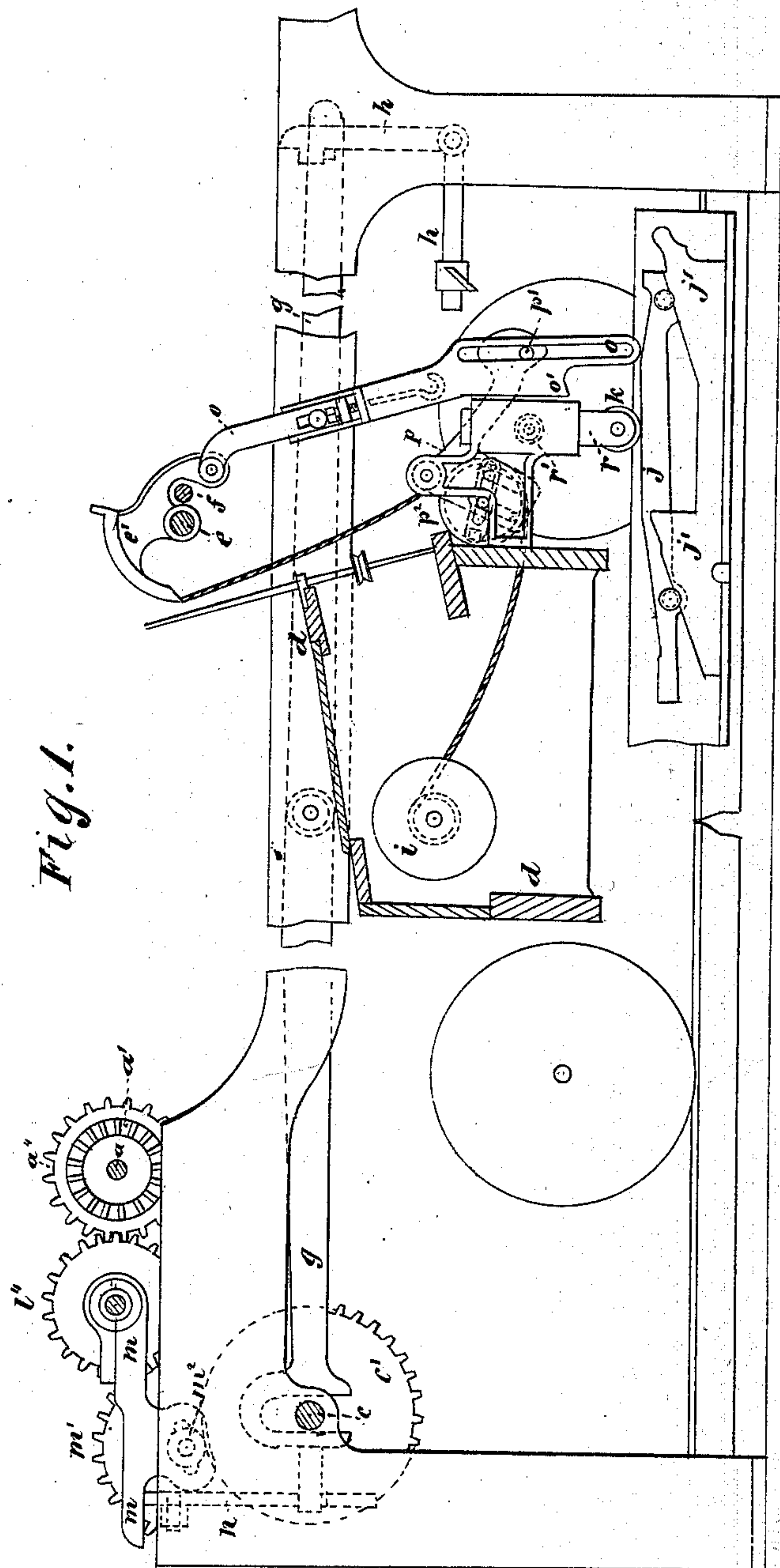


T. H. RUSHTON & R. TOUGE.
Spinning-Mules.

No. 139,737.

Patented June 10, 1873.



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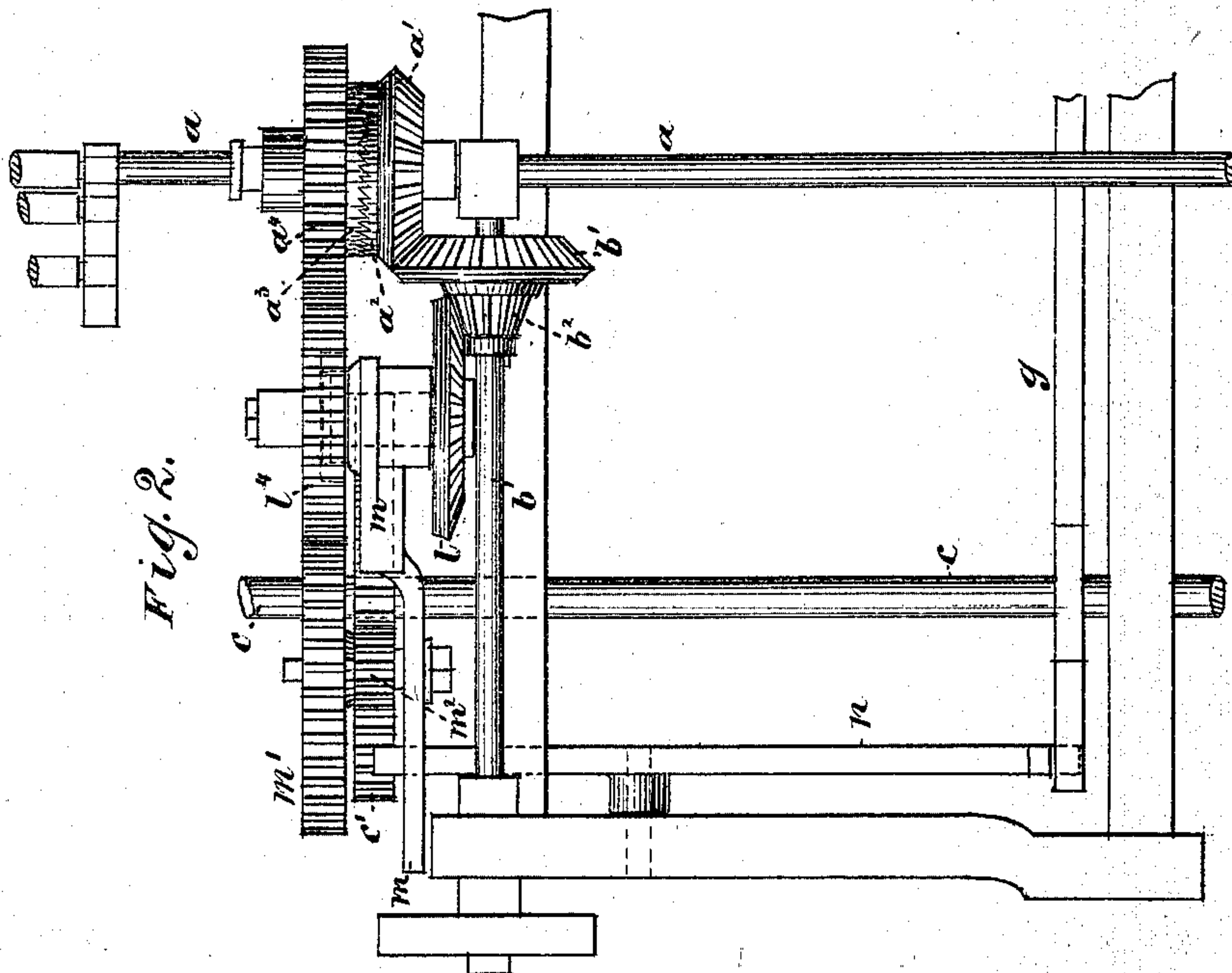


Fig. 2.

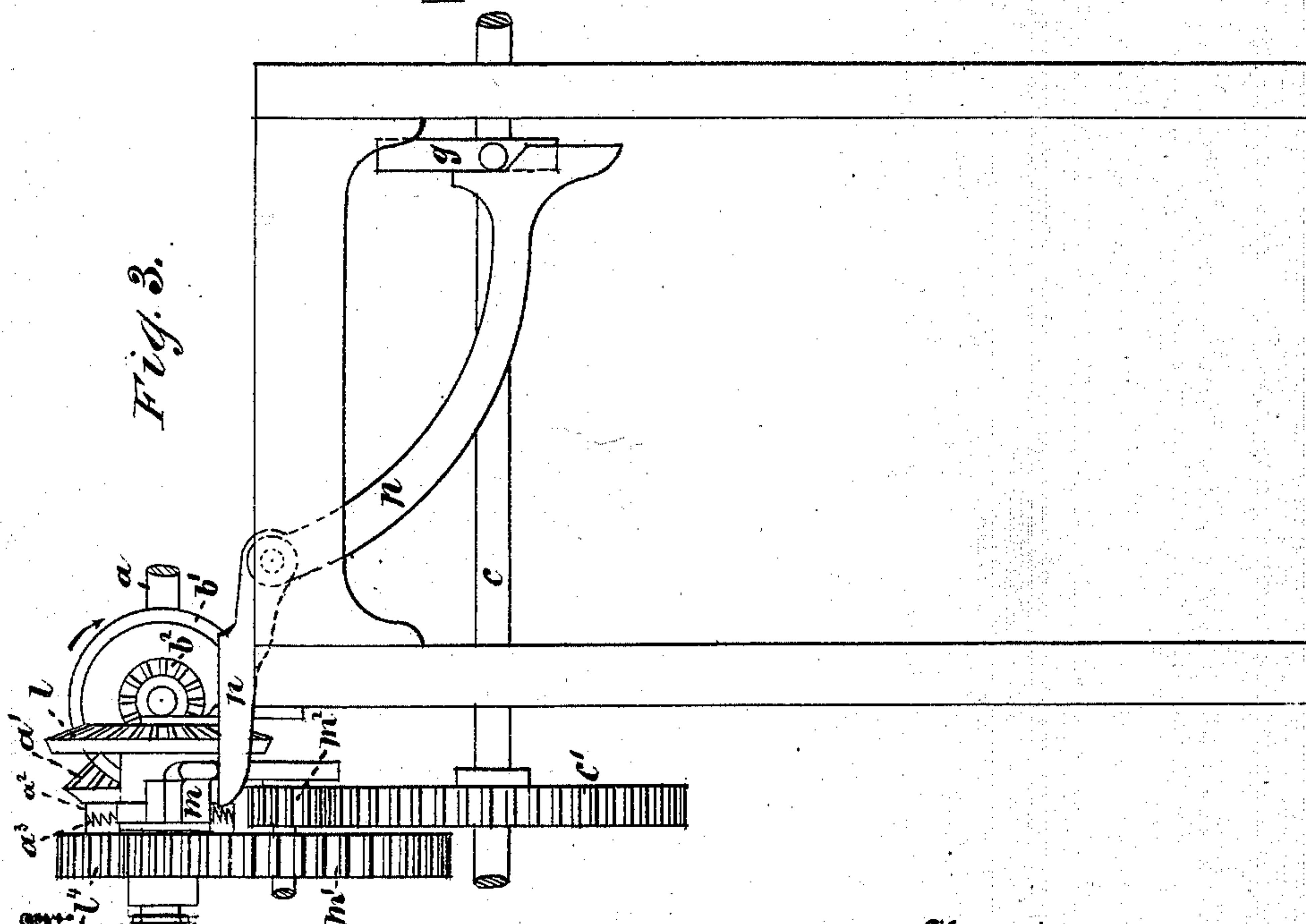


Fig. 3.

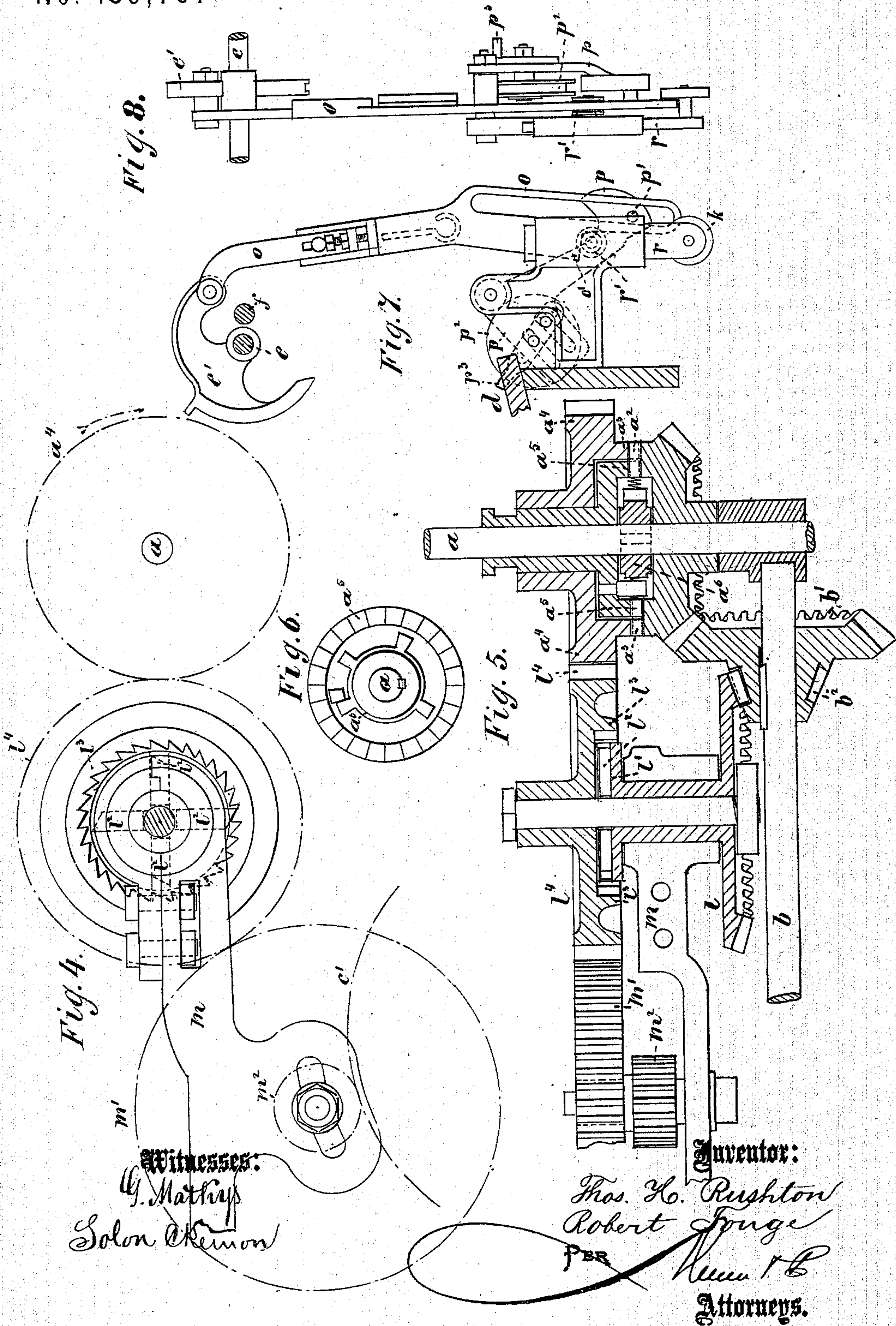
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UNITED STATES PATENT OFFICE.

THOMAS H. RUSHTON AND ROBERT TOUGE, OF BOLTON, ENGLAND.

IMPROVEMENT IN SPINNING-MULES.

Specification forming part of Letters Patent No. **139,737**, dated June 10, 1873; application filed February 27, 1873.

To all whom it may concern:

Be it known that we, THOMAS HENRY RUSHTON, of the firm of Messieurs Dobson & Barlow, of Bolton, in the county of Lancaster, in England, machine-maker, and ROBERT TOUGE, of the same place, foreman, have invented certain new and useful Improvements in Machinery for Spinning and Doubling; and we hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings forming part of this specification.

The object of the first part of our invention is to simplify the gearing of hand and self-acting mules for producing the after-stretch and for giving motion to the front roller during the twisting at the head; also, to render self-acting mules suitable for spinning fine numbers; secondly, in an improved arrangement of mechanism for locking the fallers and for unlatching the "long lever," forming parts of a self-acting mule.

Figure 1 represents the principal parts of a self-acting mule to which our improvements are applied. Fig. 2 is a plan, and Fig. 3 an end view of the same. Fig. 4 is a detached view of the mechanism forming the first part of our invention, and Fig. 5 a section of the same. Fig. 6 is a part of the said mechanism. Fig. 7 is a detached view of the mechanism forming the second part of our invention, and Fig. 8 a front view of the same.

In Figs. 1, 2, and 3, *a* is the front roller coupling-shaft. *b* is the side shaft, and *c* is the shaft on which the scrolls for driving the carriage *d* are fixed. *e* and *f* are the faller and counter-faller shafts; *e'*, the sector and lever to which the backing-off chain and faller-leg are suspended; *g*, the long lever; and *h*, the latch by which it is held in position. *i* is the backing-off scroll; *j*, the coping-rail which is acted upon by the shaper-plates *j'*, and *k* is the bowl running on the coping-rail. The parts above enumerated and the others required to complete the mule, and which are not shown or not described hereafter, are made in the usual manner. On the side shaft *b* is fixed the miter-wheel *b¹*, shown best in Figs. 4 and 5, and this wheel gears into a similar wheel, *a¹*, which is loose on the shaft *a*. To the wheel *a¹* is cast part of a clutch-box, *a²*,

which takes into the sliding clutch-box *a³* which is cast or fixed to the spur-wheel *a⁴*. Within the wheel *a¹* is an internal sliding clutch-box, *a⁵*, which takes into the clutches *a²*. The spur-wheel *a⁴* is loose on the boss of the sliding clutch-box *a⁵*. To the shaft *a* is fixed the disk *a⁶*, on the circumference of which are four or other convenient number of snugs, and between any two of these snugs the pin projecting from the clutch-box *a⁵* enters, as shown in Fig. 6. To the miter-wheel *b¹* is cast or fixed the bevel-pinion *b²*, which gears into the wheel *l*, mounted on a stud fixed in a bracket bolted to the side of the head-stock. On the boss of the bevel-wheel *l* is cast or fixed a plate, *l¹*, having eight or other convenient number of slots containing the sliding catches *l²*, which fall by their own gravity into gear with the internal ratchet-wheel *l³* cast with the carrier-wheel *l⁴*. On the boss of the bevel-wheel *l* is mounted the gearing-lever *m*. The wheel *a⁴* gears into the carrier-wheel *l⁴*, which gears into the change-wheel *m¹* mounted on a stud fixed in a segmental slot in the gearing-lever, and the wheel *m¹* is fixed on the boss of the pinion *m²*, which gears into the wheel *c'* on the scroll-shaft *c*. The end of the gearing-lever *m* rests upon the short arm of the lever *n*, seen best in Fig. 3, and the longer arm of the same is acted upon by the stud at the end of the long lever *g*.

As long as the clutch-box *a³* remains in gear with the clutches *a²* on the miter-wheel *a¹*, the scroll-shaft *c* is driven and the carriage is taken out by the train of wheels *a⁴*, *l⁴*, *m¹*, and pinion *m²*, gearing into the wheel *c'*; but when the carriage has arrived near the end of its stretch and the after-stretch is required, the clutch-box *a³* is drawn out of gear by the roller-gear rod or otherwise, thereby liberating the spur-wheel *a⁴*, which then runs loose on the boss of the sliding clutch-box *a⁵*. The pinion *b²* then becomes the driver, and the catches *l²*, taking into the ratchet-wheel *l³*, cause the wheel *l⁴* to rotate at the proper reduced speed for driving the scroll-shaft during the after-stretch.

On referring to Fig. 6 it will be seen that the pin projecting from the sliding clutch-box *a⁵* is between the two snugs on the disk *a⁶* that are nearest together, in order to start the

rollers quickly; but in spinning fine numbers it is desirable to start the rollers slower, and for that purpose the pin must be changed into one of the larger spaces between the snugs. The greater the space between the snugs the slower the rollers will be started.

By making the spur-wheel a^4 fast on the boss of the sliding clutch-box a^5 , by a set-screw or otherwise, a slow motion is imparted to the front roller during the after-stretch and while twisting at the head.

Our improved arrangement of mechanism for locking the fallers and for unlatching the long-lever is shown in Figs. 1, 7, and 8. To the sector and lever e' is suspended the faller-leg o , which is provided with a slot in which a pin, p^1 , projecting from the tumbler-lever p , slides. This tumbler-lever is mounted on a stud projecting from a bracket secured to the carriage. In the shorter arm of the tumbler-lever p is a stud for the grooved pulley p^2 , around which the backing-off chain is taken. The faller-leg o has a projection, o' , for catching on the bowl r' projecting from the usual slide-bar r . To the tumbler-lever p is fixed the adjustable finger p^3 , which acts, when the carriage is out, on the incline on the latch h . This latch holds down the outer end of the long lever g . When the carriage is going out the pinion m^2 is in gear with the wheel c' , and the long lever is held down by the usual catch, and when the carriage arrives out this catch is moved by a stud as usual. The stud at the other end of the long lever, then acting on the lever n , raises the end of the gearing-lever m and lifts the pinion m^2 out of gear with the wheel c' . The backing-off chain is then coiled

on the scroll i and pulls down the sector e' thereby raising the faller-leg until the projection o' comes over the bowl r' in the slide-bar r , as shown in Fig. 7. The backing-off chain then pulls the projection onto the said bowl, thus moving the tumbler-lever p , and this motion brings the finger p^3 against the incline on the horizontal arm of the latch h . The vertical arm of this latch then releases the end of the long lever g , which replaces the parts into the positions required for the running-in motion of the carriage.

What we claim herein as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of the bevel-gears $b^1 b^2$ $a^1 l$ with the spur-gears a^4 , l^4 , $m^1 m^2$, the clutches $a^2 a^3 a^5$, the ratchet l^3 , and the plate l^1 having the sliding catches l^2 , as and for the purpose described.

2. The combination of the roller-shaft a with the disk a^6 , having snugs placed at unequal distances apart, and the sliding clutch a^5 having a pin for engaging said snugs, as and for the purpose set forth.

3. The combination of the faller-leg o , having the shoulder o' , with the tumbler-lever p and the adjustable finger p^3 , as and for the purpose specified.

In testimony whereof we have hereunto set our hands before two subscribing witnesses.

THOMAS HENRY RUSHTON.
ROBERT TOUGE.

Witnesses:

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J. W. APPLEBEY.