2 Sheets—Sheet 1.

B. A. DOBSON & J. MACQUEEN.

Spinning Mule and Jack.

No. 213,634. Patented Mar. 25, 1879.

FIG. 2.

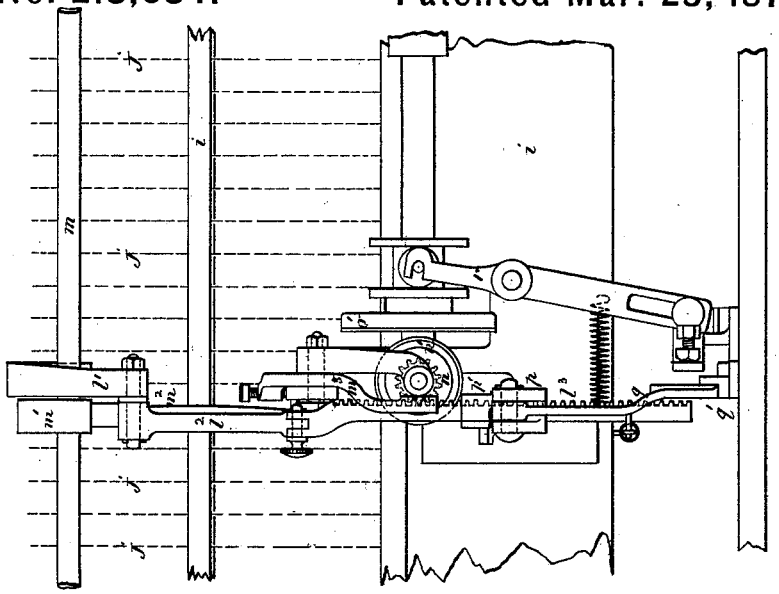
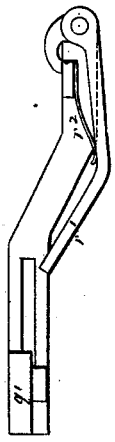
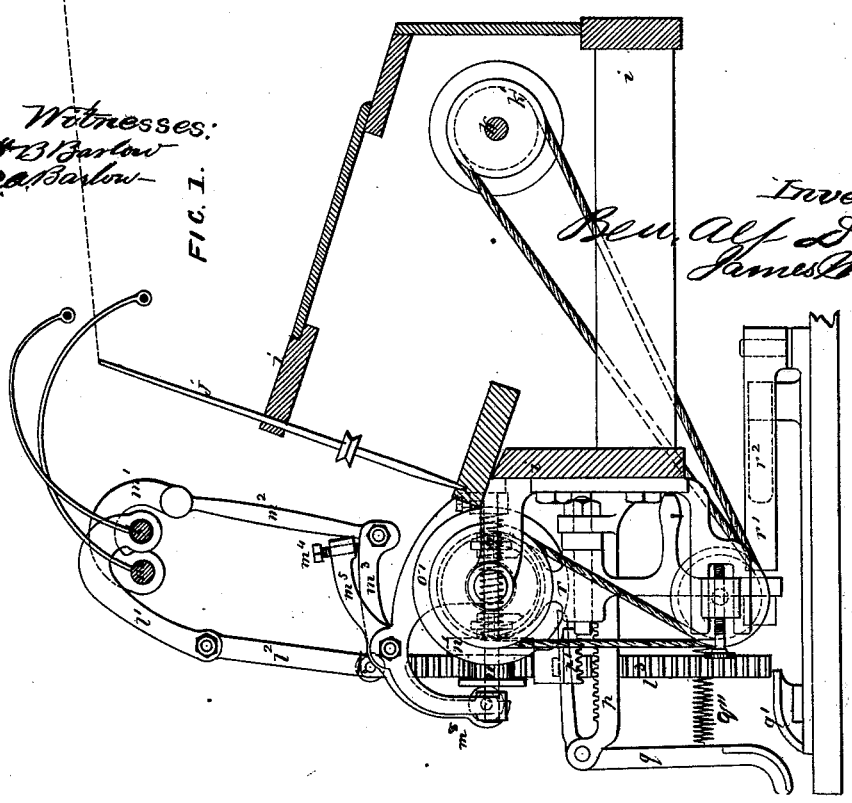


FIG. 3.



Witnesses:
W. B. Barlow
C. A. Barlow

FIG. 1.



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2 Sheets—Sheet 2.

B. A. DOBSON & J. MACQUEEN.

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FIG. 5.

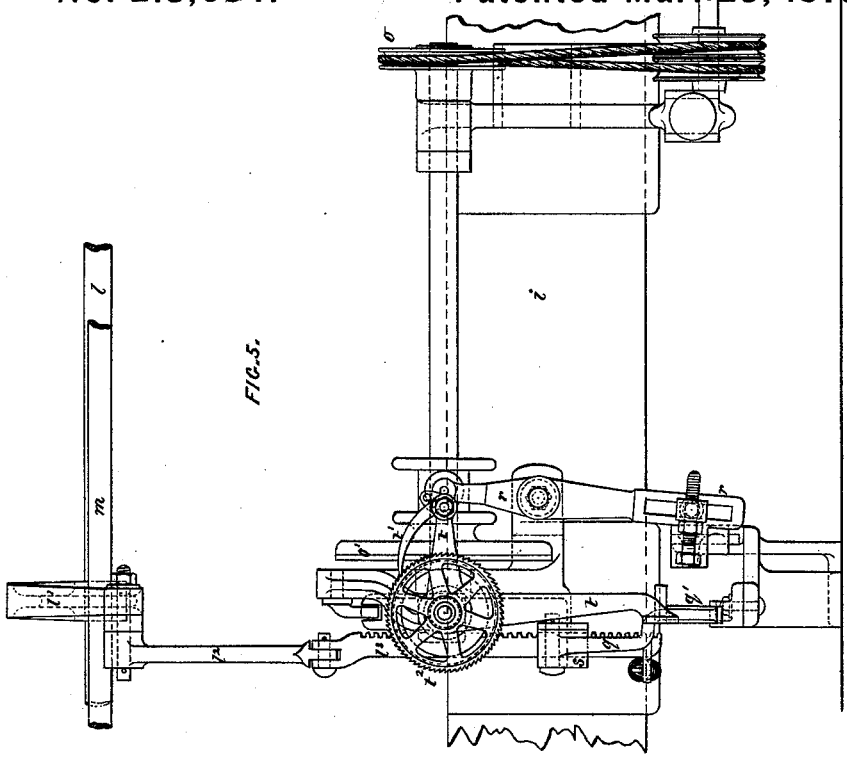
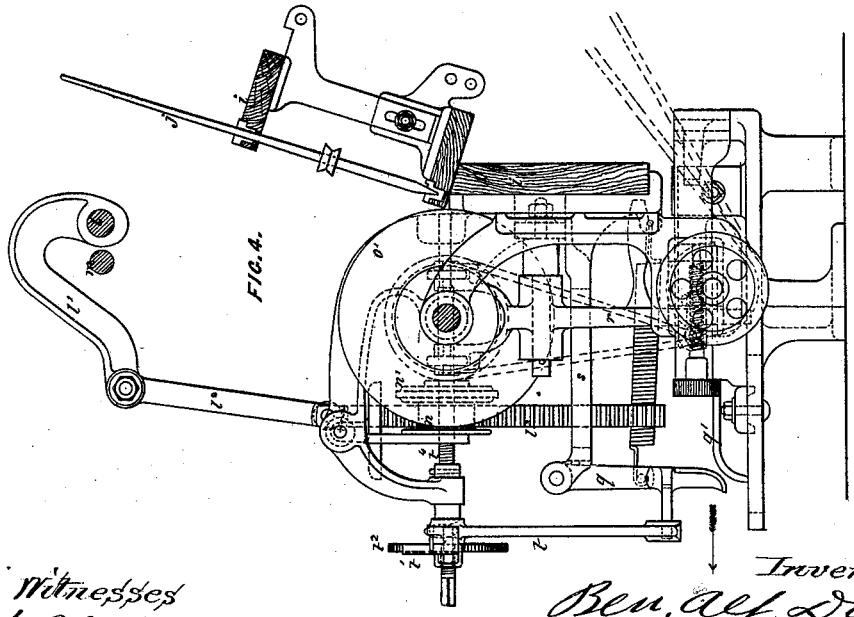


FIG. 4.



Witnesses
H. B. Barlow
C. A. Barlow

Inventors.
Ben. Alf. Dobson
James MacQueen

UNITED STATES PATENT OFFICE.

BENJAMIN A. DOBSON AND JAMES MACQUEEN, OF BOLTON, ENGLAND.

IMPROVEMENT IN SPINNING MULES AND JACKS.

Specification forming part of Letters Patent No. **213,634**, dated March 25, 1879; application filed November 19, 1878; patented in England, October 26, 1876.

To all whom it may concern:

Be it known that we, BENJAMIN ALFRED DOBSON, of the firm of Messieurs Dobson & Barlow, of Bolton, in the county of Lancaster, in England, machine-maker, and JAMES MACQUEEN, of Bolton aforesaid, machinist, have invented certain new and useful Improvements in Spinning Mules and Jacks, for spinning and doubling cotton and other fibrous materials; and we hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed two sheets of drawings, forming part of this specification.

Our improvements in machinery for spinning and doubling relate to self-acting mules; and consist of an improved combination of machinery for controlling the rising of the copping-faller after the yarn is wound on the cop, to prevent snarling or cutting.

Figure 1, Sheet 1, represents an end view, and Fig. 2 a front view, of part of the carriage of a self-acting mule for spinning and doubling, to which our improvements are applied. Fig. 3 is a plan of part of the same.

i is the carriage, *j* the spindles, *k* the tin-drum shaft, *l* the copping-faller shaft, and *m* the counter-faller shaft, all of which are made as usual.

To the copping-faller shaft *l* is fixed the lever l^1, to which are suspended the link l^2 and rack l^3, gearing into the pinion *n*, which is attached to the friction-pulley *n'*. To the counter-faller shaft *m* is also fixed the lever m^1, to which is suspended the link m^2, connected below to the lever m^3, which acts on the regulating-screw m^4 in the double lever m^5. This lever and the spring m^6 regulate the position of the friction-pulley *n'* on the face of the friction-plate *o'*, which is driven by a band passing around the pulley *k'* on the tin-drum shaft *k* and the pulley *o*, fixed to the same shaft as the friction-plate *o'*. This band can be kept tight by regulating the position of the guide-pulleys around which it passes.

The vertical rack l^3 passes through the horizontal slot in the rack *p*, fixed to the front of the carriage. Into the rack *p* gears a movable rack-piece, *p'*, which is lifted by the tension of spring *q''* upon the elbow-lever *q*, and which is allowed to drop into gear again when the elbow-lever *q* has been deflected by the adjustable tappet *q'*, fixed to the floor.

The friction-plate *o'* is pressed against the friction-pulley *n'* by the lever *r*, the lower end of which is acted upon by the incline r^1, mounted on a stud fixed to the floor. This incline is acted upon by the spring r^2 to render the pressure elastic.

When the yarn is slack in winding, the lever m^1 rises, and the double lever m^5 moves the friction-pulley *n'* toward the center of the friction-plate *o'*. Before the counter-faller has been lowered by the usual depression-lever, the elbow-lever *q* has been deflected by the tappet *q'*, and the rack-piece *p'* allowed to drop into gear with the rack *p*, thus determining the position of the friction-pulley *n'* on the face of the friction-plate *o'*.

When the yarn is tight the spring m^6 moves the friction-pulley *n'* farther from the center of the plate *o'*, and the rise of the copping-faller is consequently more rapid.

By this arrangement, when the carriage is up, the copping-faller is only allowed to rise at such a speed as will wind the slack yarn onto the blade of the spindle, thereby preventing snarling or cutting.

Figs. 4 and 5 on Sheet 2 represent two views of a modification of our invention. In these views the parts marked *i*, *j*, *l*, l^1, l^2, l^3, *m*, *n*, *n'*, *o*, *o'*, *q'*, and *r* are similar to those above described in reference to Figs. 1 and 2. In this modified arrangement the friction-pulley *n'* is moved toward the center of the disk *o'* in the following manner: Before the counter-faller has been lowered, the tappet *q'* moves the lever *q*, suspended to the slotted bracket *s*, in the direction of the arrow. An incline on the lever *q* then moves the elbow-lever *t*, to cause the catch t^1 to take a tooth in the ratchet-wheel t^2, which is fixed to the screw t^4.

The pinion *n* and the friction-pulley *n'* are loose on the nut of the screw t^4, and as the screw is turned round, the pulley *n'* is moved gradually toward the center of the disk *o'*, thereby reducing the speed of the copping-faller as it rises while the cop is being formed.

The lever *r* and the parts for actuating it

are similar to those before described in reference to Figs. 1, 2, and 3.

Our improvement may be applied to mules of the Roberts class, and generally it is applicable to self-acting or power mules, with such changes in construction or arrangement of the respective parts of the machinery as will suggest themselves to those skilled in the art.

Having thus stated the nature of our invention, and described the manner of performing the same, we declare that what we claim herein as new, and desire to secure by Letters Patent of the United States, is—

1. For controlling the rising of the copping-faller from the counter-faller, the following organized mechanical elements, namely: a rotating friction-plate, o', a friction-pulley, n', having a pinion attached, and mechanism for sliding it in a plane at right angles to the face of the friction-plate, a lever, r, operated by the incline r^1 during the movement of the mule-carriage for shifting the friction-plate o', all combined substantially as shown and described, and operating to render the rise of the copping-faller more or less rapid, as specified.

2. The combination of the copping-faller shaft l, the arm l^1 and link l^2, rack-bar l^3, pinion n, sliding friction-pulley n', spring m^6, counter-faller shaft m, arm m^1, link m^2, lever m^3, lever m^5, shifting friction-plate o', lever r, lever q, rack p, rack-piece p', and the cams fixed to the floor for operating said levers q r, substantially as shown and described, for the purpose of controlling the rising of the copping-faller.

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

BEN. ALF. DOBSON.
JAMES MACQUEEN.

Witnesses:
H. B. BARLOW,
C. A. BARLOW.