J. H. Brickill.

Self Acting Mule.

No. 21,242. Patented Aug. 24, 1858.

Fig. 1.

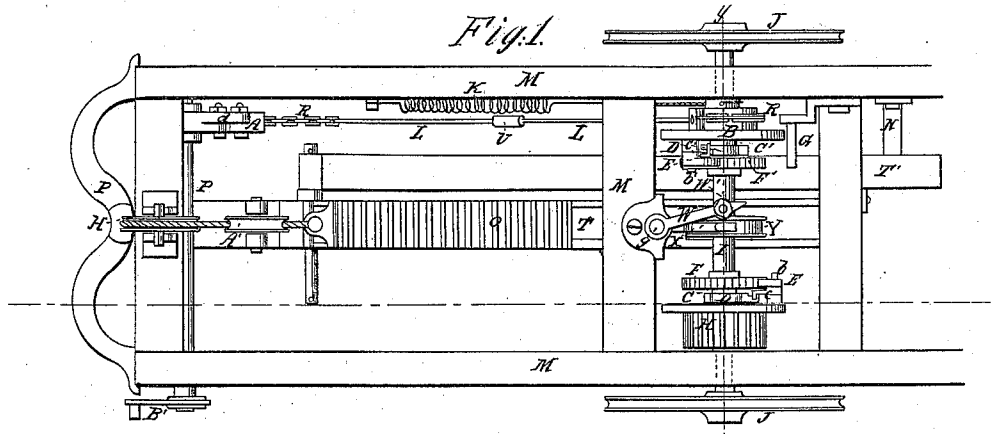


Fig. 2.

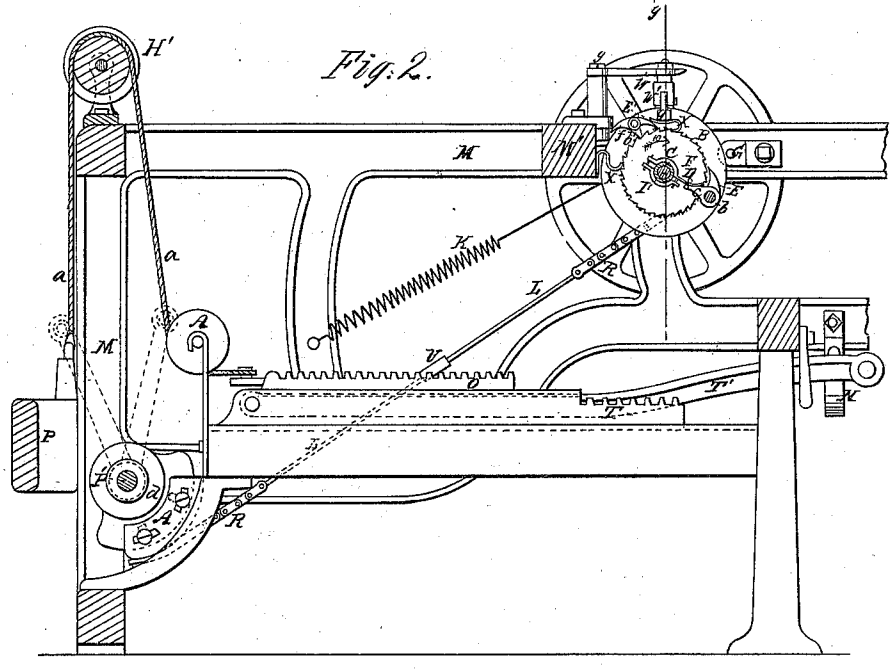


Fig. 4.

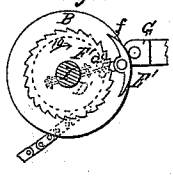


Fig. 3.

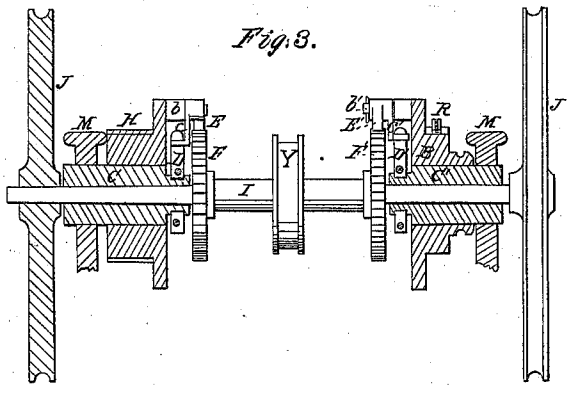


Fig. 5. Fig. 6.

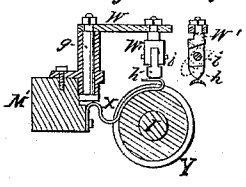
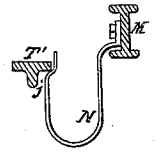


Fig. 7.



UNITED STATES PATENT OFFICE.

J. H. BRICKILL, OF TAUNTON, MASSACHUSETTS.

SPINNING-MULE.

Specification of Letters Patent No. 21,242, dated August 24, 1858.

To all whom it may concern:

Be it known that I, JAMES H. BRICKILL, of Taunton, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements 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 plan of part of the head of a mule having my improvements applied. Fig. 2, is a longitudinal vertical section of the same in the plane indicated by the line x, x, in Fig. 1. Fig. 3, is a partial vertical section in the plane indicated by the line y, y, in Figs. 1 and 2, looking in the direction of the arrow g, in Fig. 2. Figs. 4, 5, 6, and 7, are detail views which will be hereinafter explained.

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

These improvements are applicable more particularly to the self-acting mules for which Letters Patent have been granted to William Mason.

The object of the improvements is to effect the operations of "backing off" and "winding on" in a more positive manner than is possible in Mason's mule, and thus to obviate the only serious defect in that mule.

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

M, M, represents the front portion of the framing of the head of the mule.

I, is the winding shaft, occupying the usual position in the mule. The bearings for the shaft I consist of bushings C, C′, which are secured to and project some distance within the sides of the framing M, M. The said shaft has firmly secured to it, between and near the two bushings, two ratchet wheels F, F′, having their teeth set in opposite directions; the former of said ratchet wheels receiving the motion in the direction of the arrows in Figs. 2 and 4, (the latter of which figures exhibits a section of the winding shaft close to said ratchet wheel,) through which the shaft is caused to "back off;" and the other of said ratchet wheels receiving the motion in the opposite direction, through which it is caused to "wind on" the yarns. The said shaft has also secured firmly to its ends, outside the framing M, M, two grooved pulleys J, J, which receive the drum bands and which are used instead of the outside friction pulleys of Mason's mule. Two pulleys are shown, as the drawing is supposed to represent a double mule. A single mule has but one of these pulleys.

H is the winding gear, occupying the usual position in the mule, but instead of being fitted to the shaft I, it is fitted to turn on the exterior of the bushing C.

By the term "usual," as employed in this specification, I mean "common to Mason's mule," which is in common use in this country and well known.

O, is the winding rack, applied to slide in the usual manner on the main or bottom rack bar T, and gearing with the gear H, by the usual train of gearing, which it is not necessary to represent or describe. The winding rack O has applied to it the usual weight P which serves to return it after every winding on operation to the proper position to commence the repetition of the operation, the said weight being connected to said rack by a cord or chain a, running under a pulley A′, and over a pulley H′. The gear H has a flange on its inner side, and to this flange is attached a stud b, on which is a pawl E, intended to engage with and give motion to the ratchet wheel F. This pawl is caused to engage with the ratchet wheel F, when the winding gear H turns in the direction to wind on the yarn, (viz., in the opposite direction to the arrow 10, in Fig. 2) by means of a clip spring D composed of a single piece or two pieces of spring steel clamped around the bushing C. The point of this spring enters between two small projections on an arm c, which is one piece with the pawl E; and when the gear turns in the direction above specified, the friction of the spring upon the bushing causes the said spring to stop the arm c, of the pawl when the gear starts, and thus throw the point of the pawl into the teeth of the ratchet before the spring begins to turn on the bushing. When the gear H stops winding on, its motion is immediately reversed and the friction of the spring on the bushing takes out the pawl from the ratchet wheel.

P′, is the rockshaft, arranged near the bottom of the front end of the head of the mule, and corresponding in its duties with the similarly arranged rockshaft in Mason's mule, and deriving a similar motion through

similar connections with a similar arm B′, at one end. The arm is represented in Fig. 1, and in Fig. 2 it is shown in red outline. This shaft carries a sector-shaped plate or cam A *d*, the arc of which is connected by a chain R, with the periphery of a pulley B, which is fitted to turn on the bushing C′. This pulley has a flange to which is attached by a pin *b*′, a pawl E′, capable of engaging with the "backing-off" ratchet wheel F′. This pawl (shown in Figs. 1, 2, and 4) is like that E, attached to the winding-on gear, except that it is extended backward from its tooth on the opposite side of the pin *b*′, as shown at *f*, for the purpose of causing it to be thrown out of gear by striking a stationary pin G, attached to the framing. The said pawl E′ has applied to it a clip spring D′, (Figs. 1, 2, and 4) like D, said spring being clamped around the bushing C′. The distance which the arm B′, of the rockshaft P′ moves is shown in Fig. 2, where it is represented at the two extremities of its movement. By the movement of said arm to the right, (looking at Fig. 2) the cam A *d*, is caused to wind the chain R, and twin the pulley B, in the direction of the arrow 10, by which means the spring D′ is caused to throw the pawl E′, into gear with the ratchet wheel F′, and hence the pawl is made to turn the shaft I, in said direction to effect the "backing off." Just as the above movement of the arm B′, terminates, the part *f*, of the pawl E′, strikes the pin G, and causes the tooth of the said pawl to be disengaged from the ratchet wheel so as to permit the shaft I, to be turned in the opposite direction by the pawl E, to effect the winding on of the yarn.

The cam A *d*, is made in two parts, one part *d*, constituting the hub and a flange being keyed to the shaft P, and the other part A, which constitutes the rim and receives the chain being bolted to the shaft by bolts passing through slots which permits it to be set in or out to or from the center of the shaft to allow the amount of "backing off" to be adjusted. The chain R, has in it two connecting rods L, L, on which are right and left-handed screws to which are fitted a swivel nut U, which provides for the tightening of the chain. The pulley B has applied to it a spring K, connected by a chain K′, by which, when the arm B′ of the shaft P′ is moved to the left, the pulley B is drawn back to bring its pawl to a position to commence the repetition of the "backing off" when the proper time arrives.

The winding shaft I is furnished with a brake wheel Y, to which is applied a friction brake X, which is secured to the cross bar M′, of the framing. This brake (which is perhaps best shown in Fig. 5, which is a section in a plane parallel with Fig. 2) is composed of a piece of spring steel, which when left free springs off the wheel Y. The brake-wheel and brake occupy a position below the horizontally moving shipper W, which moves on a fixed pin *g*, to shift the main belt of the mule. This shipper is the same as that in Mason's mule, but the whole of it is not shown in the drawing. It has attached to it and below it, just over the extremity of the brake X, a small block W′, to which a tooth *h*, is jointed by a pin *i*. The top of this tooth is so beveled as shown in Fig. 6, which is a section parallel with Fig. 3, and the corresponding portion of the block W′ beveled in a corresponding manner, that when the shipper—in its usual movement after the operation of driving out the carriage has been performed—passes over toward the ratchet wheel F, the tooth becomes rigid with the shipper and presses the brake upon the brake wheel as it passes over it; but so that when it moves in the opposite direction, the tooth swings aside in the manner shown in red outline in Fig. 6, and does not press upon the brake. The object of the brake is to stop or at least to reduce very considerably the momentum of the winding shaft so that the pawl E′, in coming into operation on the ratchet wheel F′, may not cause any damage by the violent shock which might be produced. In Mason's mule, it may be stated, it is absolutely necessary that there shall be a certain amount of momentum in the winding shaft to bring the parts of the machinery into proper condition to commence "backing off"; but with my method of effecting the "winding on" and "backing off," this momentum is not necessary, but on the contrary very objectionable.

T′, is the connecting rod commonly employed to operate the lower rack T, and winding rack O. This rod is the same as is used in Mason's mule, and operated in the same manner by a stud attached to the periphery of a large gear, which is not shown. When the racks T and O are in their most forward positions, the weight of the rod T′, on the gear has a tendency to cause it to fall back a little from the position to which it has been carried to move the racks to the position specified and by that means to give to the rack O, a slight motion by which it is caused to move the winding gear in a direction to throw its pawl E into gear with the ratchet wheel F. Should the pawl be thus thrown into gear at this stage of the operation of the machine, when the pawl E′, is in gear with the ratchet wheel F′, it would be productive of great injury to the mule; and hence I employ to prevent such an occurrence a spring catch N, to receive the rod T′, and support it when it reaches its highest position which it does as the racks reach their most forward position. Fig. 7 repre-

sents a back view of the spring catch N, and a section of the connecting rod T′, and part of the framing M, which are also shown in Figs. 1 and 2. The spring catch N is formed with a rounded jog at *j* (Fig. 7) which receives the edge of the connecting rod, and is strong enough to support the weight of said rod, but as soon as power is applied to move the rod downward, it springs aside and permits the rod to pass it.

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

1. Arranging the winding gear H, loose on a stationary bushing C, or its equivalent which surrounds and forms one of the bearings of the winding shaft, and applying a pawl E, attached to said gear, and a spring D fitted to the bushing, to engage the said gear with a ratchet wheel F, fast on the winding shaft, in the manner described, whereby the winding shaft and winding gear are permitted to be entirely disconnected during the operation of backing off.

2. The combination of the adjustable cam A *d*, on the rockshaft P′, the loose pulley B working on the stationary bushing C′, or its equivalent surrounding the winding shaft, the pawl E′, on said pulley, the clip spring D′, on the bushing, and the ratchet wheel F′, on the winding shaft; the whole operating together substantially as described to effect the backing off of the yarns, and in combination with the pawl E′, I claim the pin G, applied as described to disengage said pawl, and permit the reversal of the shaft to wind on the yarns.

3. The combination of the brake-wheel Y, on the winding shaft, the brake X, and the tooth *h*, on the belt-shipper, substantially as described, for the purpose of stopping or reducing the momentum of the winding-shaft previous to the operation of backing off.

JAMES H. BRICKILL.

Witnesses:

EDMUND H. BENNETT,

JOSHUA GETLOW.