

(No Model.)

S. JACKSON.
SPINNING MULE.

No. 273,997.

Patented Mar. 13, 1883.

Fig:1.

Fig:2.

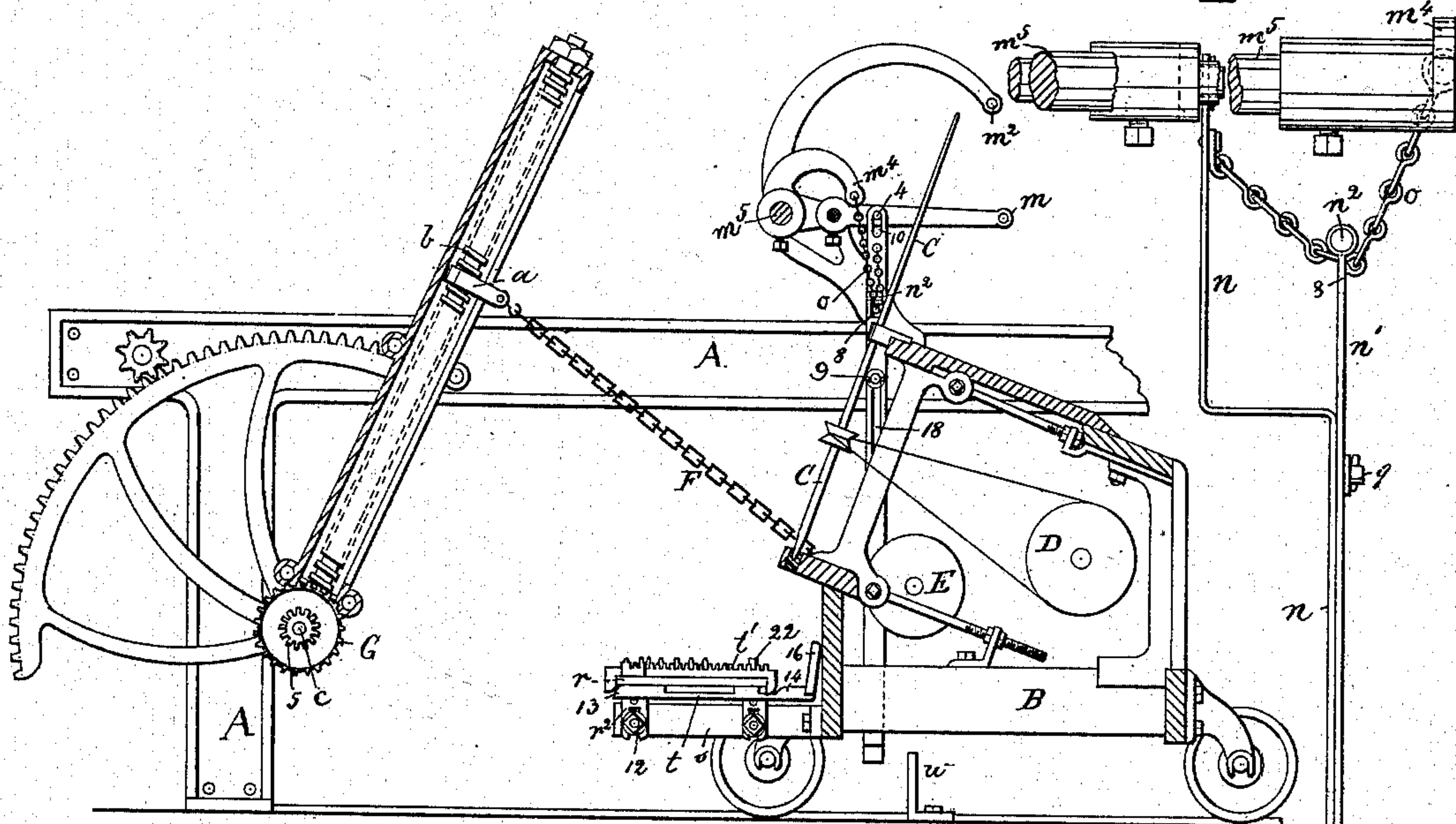


Fig:3.

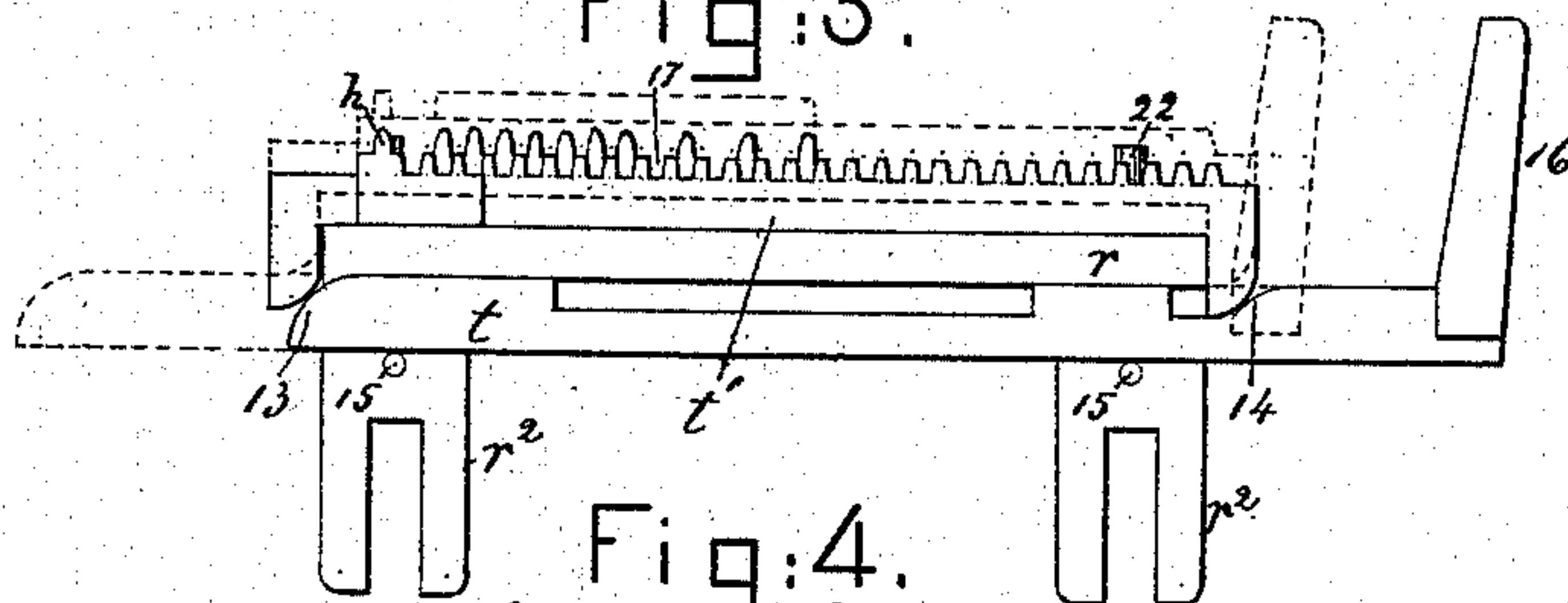


Fig:4.

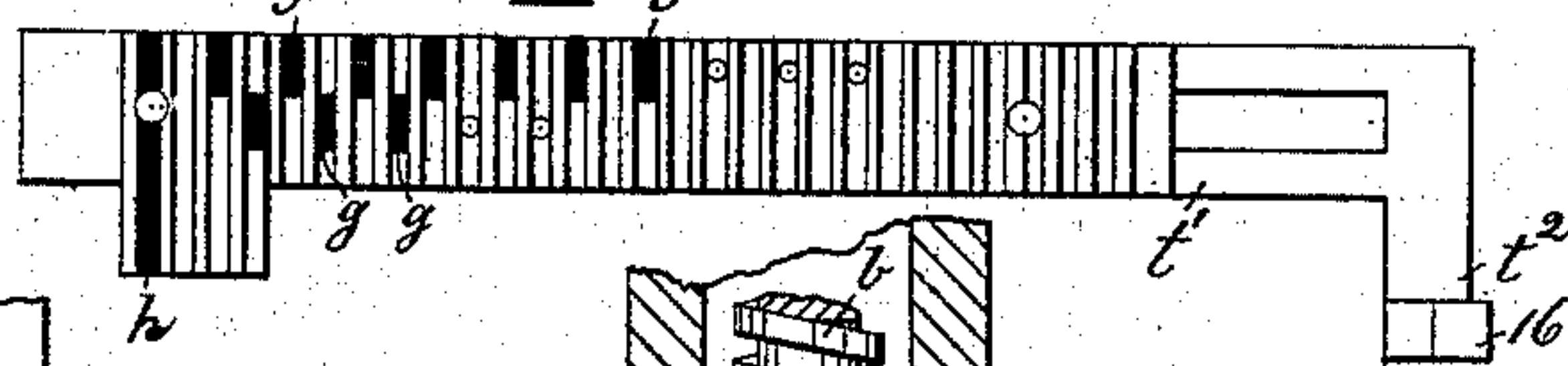


Fig:5.

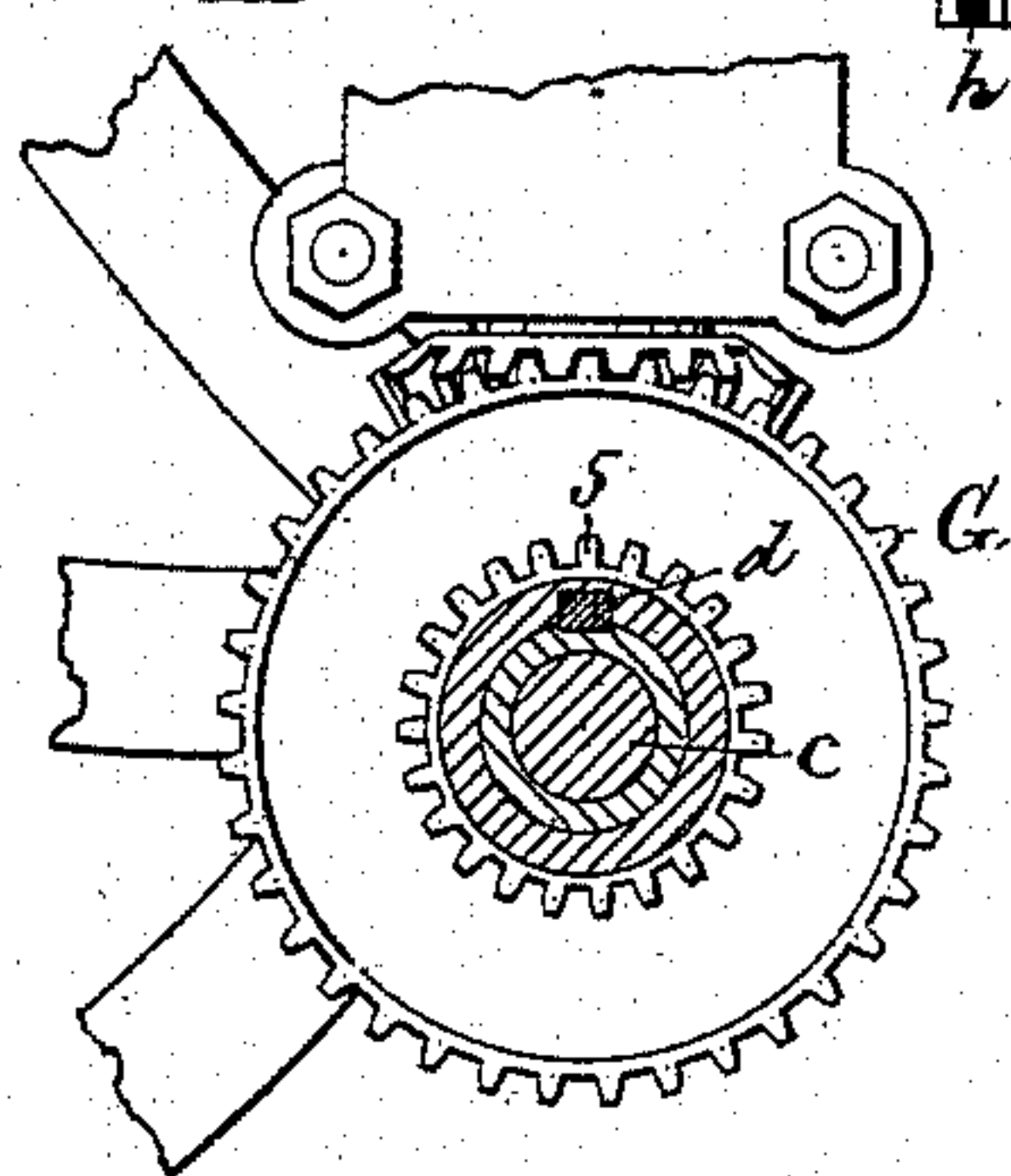
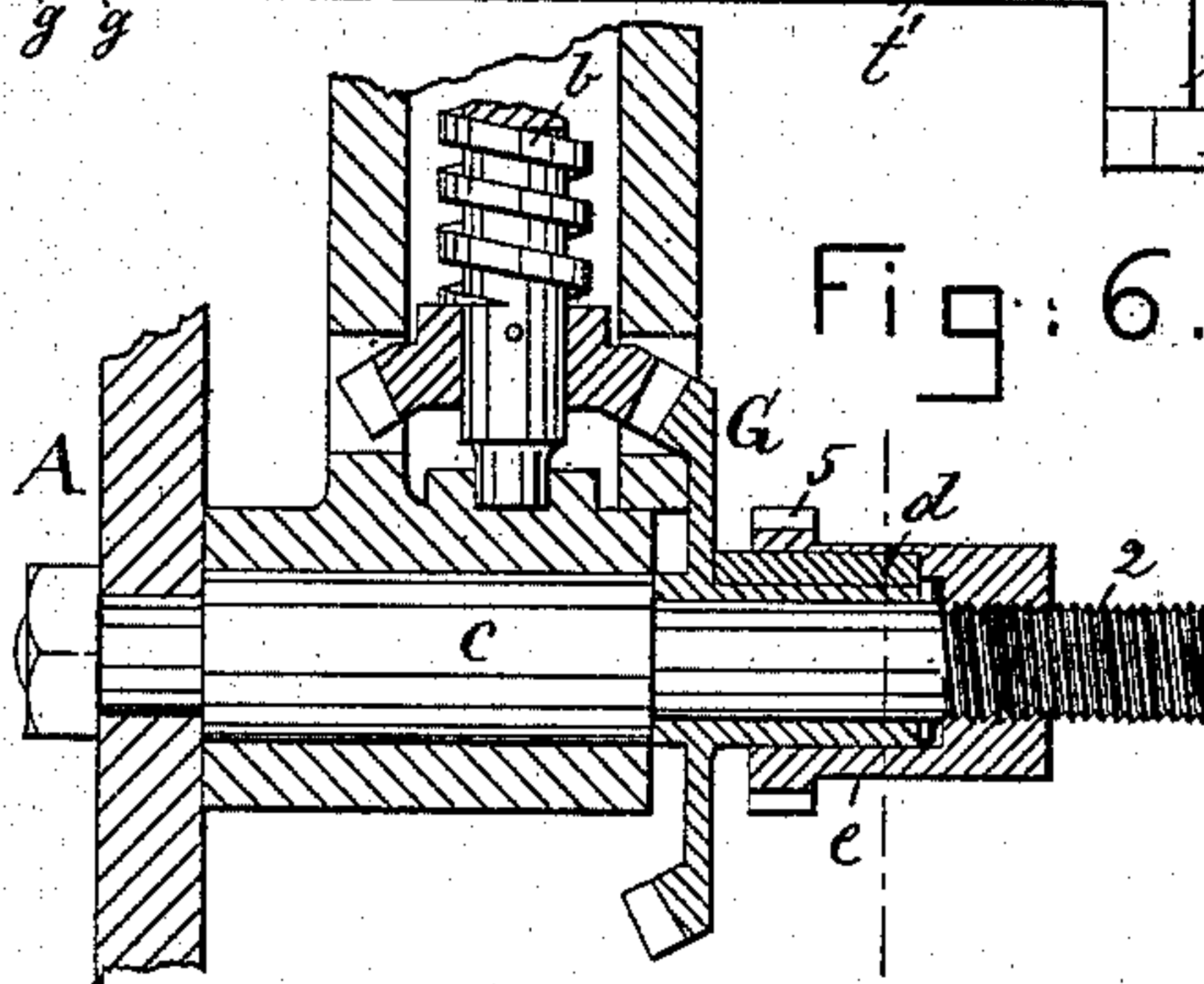


Fig:6.



Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL JACKSON, OF LAWRENCE, MASSACHUSETTS.

SPINNING-MULE.

SPECIFICATION forming part of Letters Patent No. 273,997, dated March 13, 1883.

Application filed August 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL JACKSON, of Lawrence, county of Essex, State of Massachusetts, have invented a new and useful Improvement in Spinning-Mules, of which the following description, in connection with the accompanying drawings, is a specification.

This invention in spinning-mules is an improvement on my patent of the United States, No. 184,782, November 28, 1876, to which reference may be had.

The invention relates to that part of the mule which regulates the winding of the yarn on the spindle or on a bobbin thereon, as the carriage runs in.

In my said patent I employed a so-called "regulator," which was raised as the carriage nearly completed its inward run and when the faller was most depressed, the faller being instrumental in raising the regulator through an elbow-lever. This regulator, so raised at the inward run of the carriage, was kept elevated, so that its top, made as a friction-surface, engaged a friction-wheel on the hub of the bevel-gear commonly located at the pivotal point of the quadrant, the friction-surface of the regulator turning the said gears and moving the quadrant-screw and its nut while the carriage approached the end of its outward movement; and as the carriage completed its outward movement the regulator was automatically lowered, so that its friction-surface, which just operated the said gear, passed and failed to operate the said gear as the carriage was run in.

In this my present invention I have dispensed with the elbow-lever marked B in the said patent, and have employed instead of it two independently-movable depending bars, controlled as to their position by their connection with the faller and counter or tension faller, as will be herein described; and instead of employing a friction-surface for the regulator I have provided the regulator with two or more series of teeth, preferably made removable and of greater or less number in each series, according to the size of yarn being spun—the coarser the yarn the more the teeth, as the quadrant-nut must be changed more rapidly for coarse yarn.

My improved regulator, instead of engaging a toothed gear on the hub of the bevel-gear of the quadrant, is made to engage a toothed gear

on a sleeve keyed on the hub of the bevel-gear of the quadrant, so as to rotate the said quadrant bevel-gear as the gear of the sleeve is engaged by the teeth of the regulator. The rear end of the sleeve referred to is provided with an internal screw-thread to engage a screw-threaded portion of a stationary-stud, which serves as the support for the said bevel-gear of the quadrant, so that, as the said gear is from time to time engaged and rotated by the teeth of the regulator, the sleeve and its gear will be moved laterally and horizontally, so as to engage at different times the different series of teeth of the regulator, the key-connection of the hub and sleeve referred to permitting horizontal movement of the sleeve without disconnecting it from the hub of the bevel-gear.

My invention consists in the mechanism and combinations of mechanism herein referred to, and as will be hereinafter set forth in the claims at the end of this specification.

Figure 1 represents in side elevation and partial section a sufficient portion of a spinning-mule to illustrate my present improvements. Fig. 2 is an enlarged detail, showing the depending bars and the manner of their connection with the arms of the faller and counter or tension faller, a chain being used to support and adjust the said depending bars. Fig. 3 is an enlarged side elevation of the regulator in its depressed position, the dotted lines showing it in its elevated position when it is to engage with the gear of the sleeve. Fig. 4 is a top view of the regulator. Fig. 5 is a detail of the lower portion of the quadrant, its bevel-gear, and the sleeve and the gear applied to the hub of the bevel-gear of the quadrant; and Fig. 6 is a longitudinal section taken through the lower end of the quadrant, its gear, and the sleeve, the stud and quadrant-screw being shown in elevation.

In the drawings, A represents part of the frame-work of a spinning-mule; B, the usual carriage; C, one of the spindles; D, the tin cylinder; E, the usual drum to receive the chain F, connected with the nut *a* of the quadrant-screw *b*, the said drums being driven all as usual.

The quadrant bevel-gear G, mounted on the stationary stud *c* and driving the quadrant-screw in the usual manner, has upon its hub

a key or spline, d , and the stud c is provided with a screw-thread, 2. This screw-thread 2 is engaged by internal screw-threads of the sleeve e . This sleeve surrounds the hub of the bevel-gear, is slotted to fit the spline d , and has upon it a narrow gear, 5, which is engaged intermittingly or as the carriage nearly completes its outward run by the teeth of the series of teeth f or g , (shown in heavy block in Fig. 4,) and is rotated more or less to turn the quadrant-screw b a greater or less distance, as may be necessary. The series of teeth f , which is the greatest in number, in practice usually having seven teeth for about No. 37 yarn, engages the gear 5 when commencing to wind the cop or bobbin, the said row of teeth continuing to engage the said gear for twelve stretches, more or less, according to the size of the yarn. This sleeve is gradually shifted or moved laterally on the hub of the bevel-gear G by reason of the screw-threaded stud c , engaged by it, and after about the number of stretches stated the sleeve and gear are moved so far laterally as to bring the gear 5 into position to be engaged by the series g of teeth, which in practice will have about half the number of teeth as those in series f , the series g continuing to move the sleeve and bevel-gear of the quadrant for, say, twelve stretches (more or less) when the sleeve and gear are moved so far laterally as to disengage the gear 5 from the series g of teeth, so that the said gear 5 will thereafter be engaged and turned by the single tooth h , which continues in operation until the bottom of the cop or bobbin is finished, after which the quadrant-screw and nut are not changed until a new set of cops or bobbins are to be commenced, when the quadrant-screw is turned and the nut run down by hand. After the tooth h ceases to operate the screw and nut of the quadrant, as above stated, the variations in the speed of the spindles at each stretch is thereafter regular, and such variation in speed is produced by the vibrations of the quadrant, the latter being turned backward and forward in any usual manner.

The faller m and counter or tension faller m^2 are both as common to other mules. The arm of the faller m has a pin or stud, 4, to receive upon it the upper end of the main depending bar n , while an arm, m^4 , of the counter-faller shaft m^5 has hooked upon or engaged with it one end of a chain, o , as in Figs. 1 and 2, the other end of the said chain being secured to a hook on the bar n . This chain is passed through an opening, 8, made in the auxiliary depending bar n' , and under a roller, n^2 , carried by said bar. As the faller and counter-faller change their position during the inward run of the carriage these bars n and n' are raised and lowered as the faller and counter faller are raised and lowered. The auxiliary bar n' is slotted at 18 to receive a pin or stud, 9, projecting from the main bar n , the said pin or stud guiding the bar n' in its movements. The lower end of the bar n for, say, eight or ten stretches, (more or less,) as the

winding of the bobbins is commenced, is made instrumental through a stop, w , on the floor to shift the regulator, to be hereinafter described, but thereafter the auxiliary bar n' is effective for such purpose. The upper end of the bar n is slotted at 10, where it engages the pin of the faller m , so that should the regulator have been moved too often by the said bar during the number of stretches that the said bar n should operate and the yarn have become loose, the counter or tension faller by its upward movement will, through the chain o , act upon the auxiliary bar n' , and lift it until the lower end of the slot 18, made therein, strikes the pin or stud 9, when further upward movement of the bar n' will cause the bar n to be lifted out of range of the said stop. The upper end of the bar n , as before described, is supported by a pin, 4, in the arm of the faller m , as shown in Fig. 1, and during the first eight or ten stretches, while guiding the yarn to the base of the bobbin or cop, the position of the faller is such as to permit the lower end of bar n to strike the stop w . As the cop is formed the faller gradually rises to a higher point and descends not quite so far, as is well understood, and finally the lower end of bar n is lifted by the faller so high as to escape stop w , and thereafter the lower end of bar n' will strike the stop, provided the yarn has become so taut as to depress the counter-faller m^2 far enough to permit the said bar n' to be lowered, as is the case only when the yarn becomes too taut and would be liable to be broken. If not too taut, and all things are working right, both bars will pass above the stop w after the formation of the bottom of the cop. It is well understood that the yarn from the spindle extends under faller m and then over the counter or tension faller m^2 to the rollers, and when the yarn is too taut the counter or tension faller is depressed so that the chain o , holding up the bar n' , is made sufficiently slack to lower the said bar n' far enough to strike the stop w and operate the regulator to be described.

The regulator is composed of a base, r , having suitable legs or ears, r^2 , which are bolted by bolts 12 to an arm, s , connected with the carriage, and of a slotted sliding bar, t , having wedges 13 14, and of a tooth-holding slide, t' , having feet beveled in one direction and adapted to rest on the wedges of the sliding bar, so that longitudinal movement of the sliding bar, which latter is supported by pins 15 of the base r , will cause the wedges or inclines thereon to lift the tooth-holding bar or lower it according to the direction of movement of the said sliding bar, suitable rods or standards, 22, connected with the base r , extending up through suitable holes in and guiding the tooth-holding bar t' as it is raised or lowered.

The bar n' , when lowered by reason of the yarn being about to become too taut for proper winding, strikes the stop w , secured to the floor over which the carriage travels, and is arrested sufficiently to hold the arm t^2 of the

sliding bar, also moving with the carriage and then resting against the depending bar n' , while the carriage, and base, and tooth supporter or holding bar continue to move in unison with the carriage. The bar n or n' , when depressed sufficiently low, is arrested, as described, by stop w , and the sliding bar shifted with relation to the tooth-holding part of the regulator, when the carriage has been run in for about two-thirds of its distance, and the tooth-carrying bar is then lifted from the full-line position, Figs. 1 and 3, to the dotted-line position, Fig. 3. This tooth-carrying bar is provided with a series of notches, 17, to receive the independent removable teeth of the series of teeth f and the series of teeth g , placed at different distances from the inner side of the said tooth-carrying bar, and it is also at or near its outer end provided with one long tooth, h . The tooth-carrying bar having been thus elevated during the inward run of the carriage into position for either series of teeth f g or the single tooth h to engage with the gear 5 on the sleeve e , those of its teeth which are to act will engage and operate the gear 5 as the carriage is moved outward, but as soon as the finger 16 of the arm t^2 of the slide-bar during the outward movement of the carriage meets the sleeve e the further movement of the slide-bar in that direction is arrested, while the base r and tooth-carrier continue to move a little with the carriage, and the tooth-carrier is thus permitted to descend, so that as the carriage is run in the said teeth of the tooth-carrier will pass under but out of contact with the gear 5.

Instead of the chain o , I might use a cord or flexible wire rope.

I claim—

1. The carriage provided with the base r , the slide-bar, and tooth-carrier, combined with the stop w , bars n and n' , and the faller and counter or tension faller operatively connected therewith to actuate the slide-bar during the inward run of the carriage, substantially as and for the purpose described.

2. The quadrant, its screw, the nut thereon, and chain and chain-drum, the bevel-gear G , the screw-threaded stud, the gear 5, and the sleeve upon which the latter gear is placed, the said sleeve being loosely connected with the said bevel-gear or its hub, combined with the carriage and tooth-holder having a series of teeth, substantially as described.

3. The counter-faller bar n and its stud or pin, the faller m , to which the said bar is attached, and the chain connected with the faller and counter-faller, combined with the slotted bar n' , supported by the said chain and made longitudinally movable at the side of the bar n , as and for the purpose set forth.

4. The tooth-carrying bar provided with its removable series of teeth f g and tooth h , and feet, beveled, as shown and described, combined with the sliding bar provided with wedges, and with means to support and actuate the said sliding bar, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL JACKSON.

Witnesses:

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BERNICE J. NOYES.