

P. McGOVERN.  
Spinning-Mules.

No. 153,975.

Patented Aug. 11, 1874.

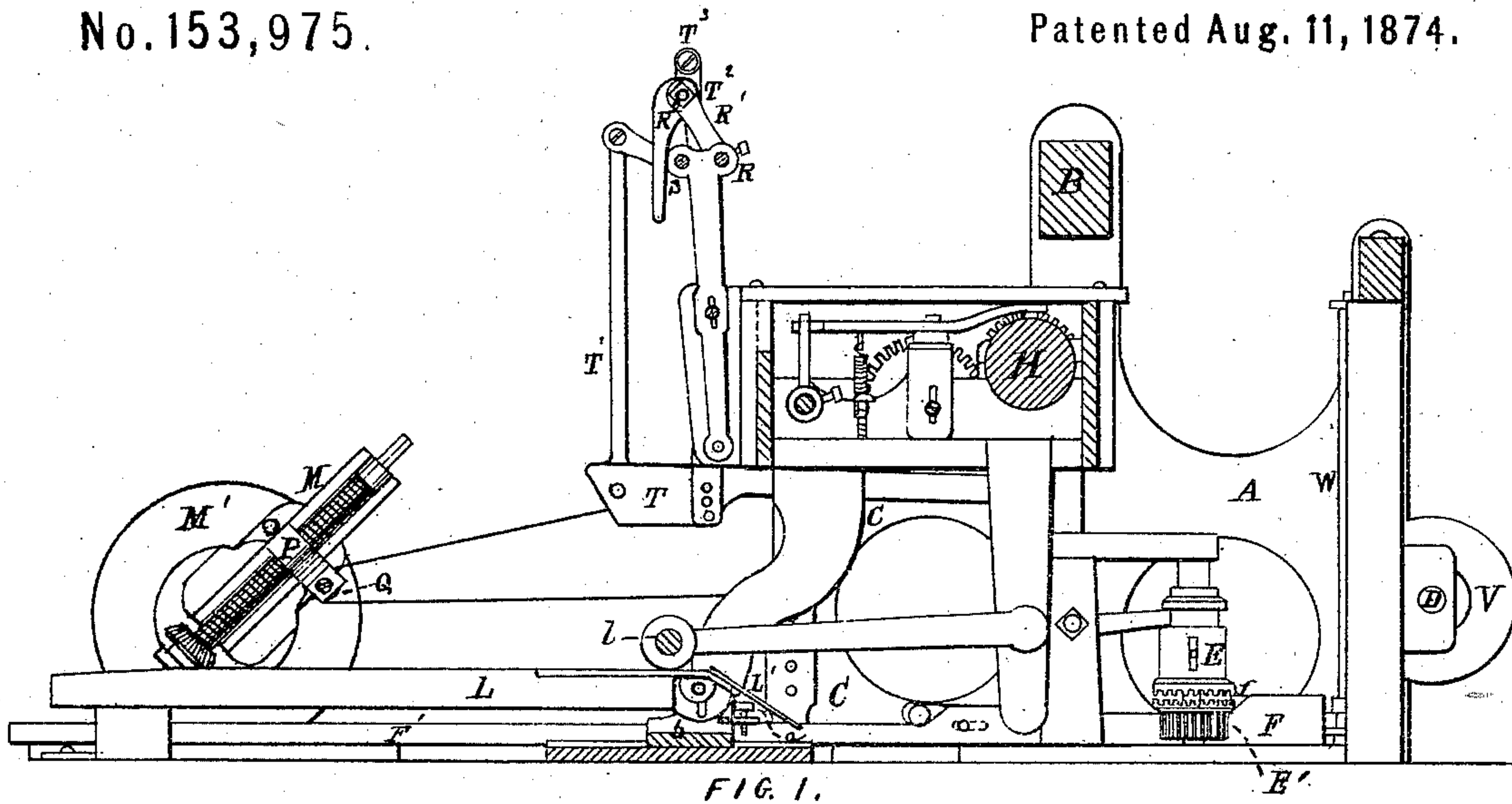


FIG. 1.

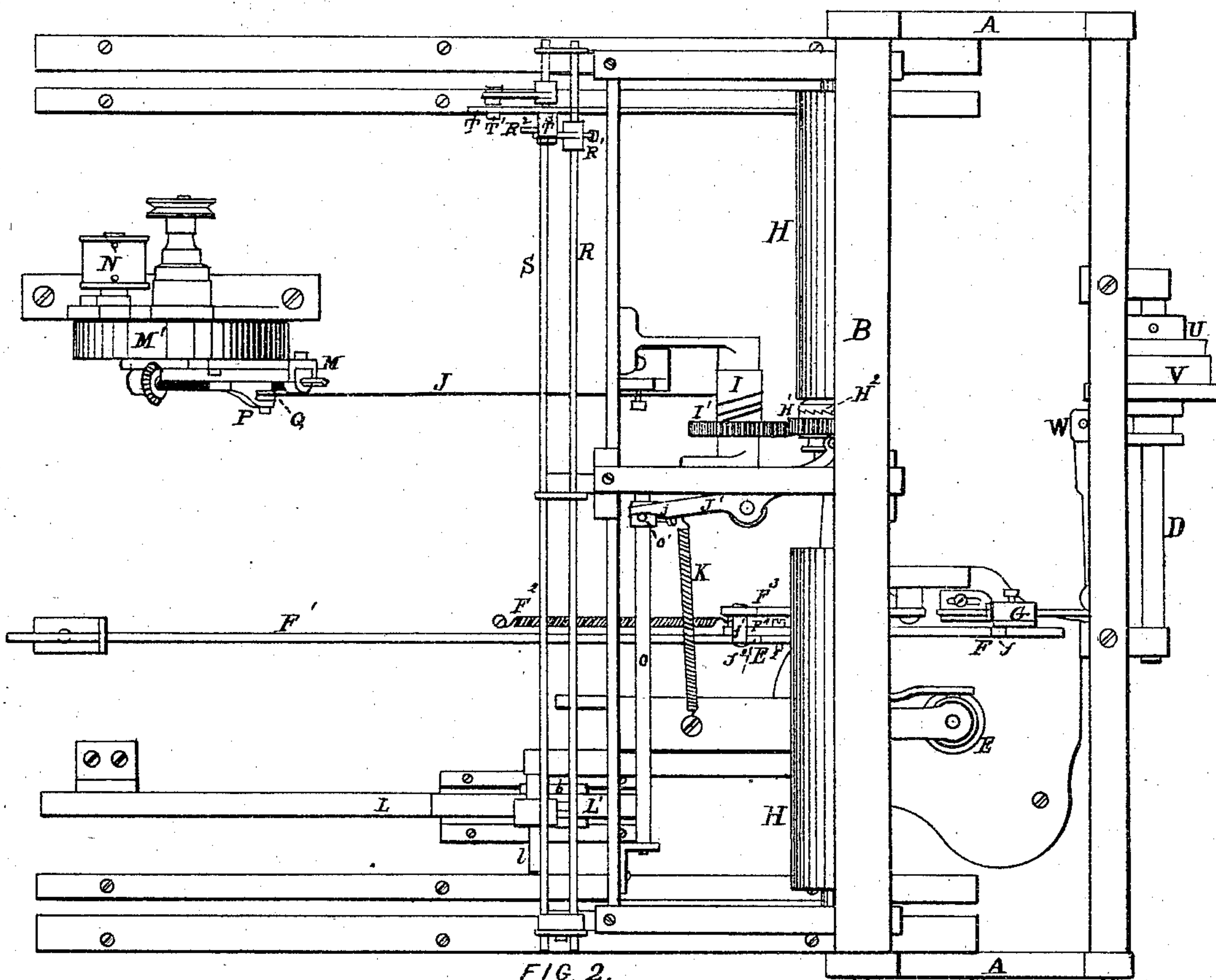


FIG. 2.

Witnesses

N. C. Lombard  
Wm. C. Hibbard

Inventor

Peter McGovern

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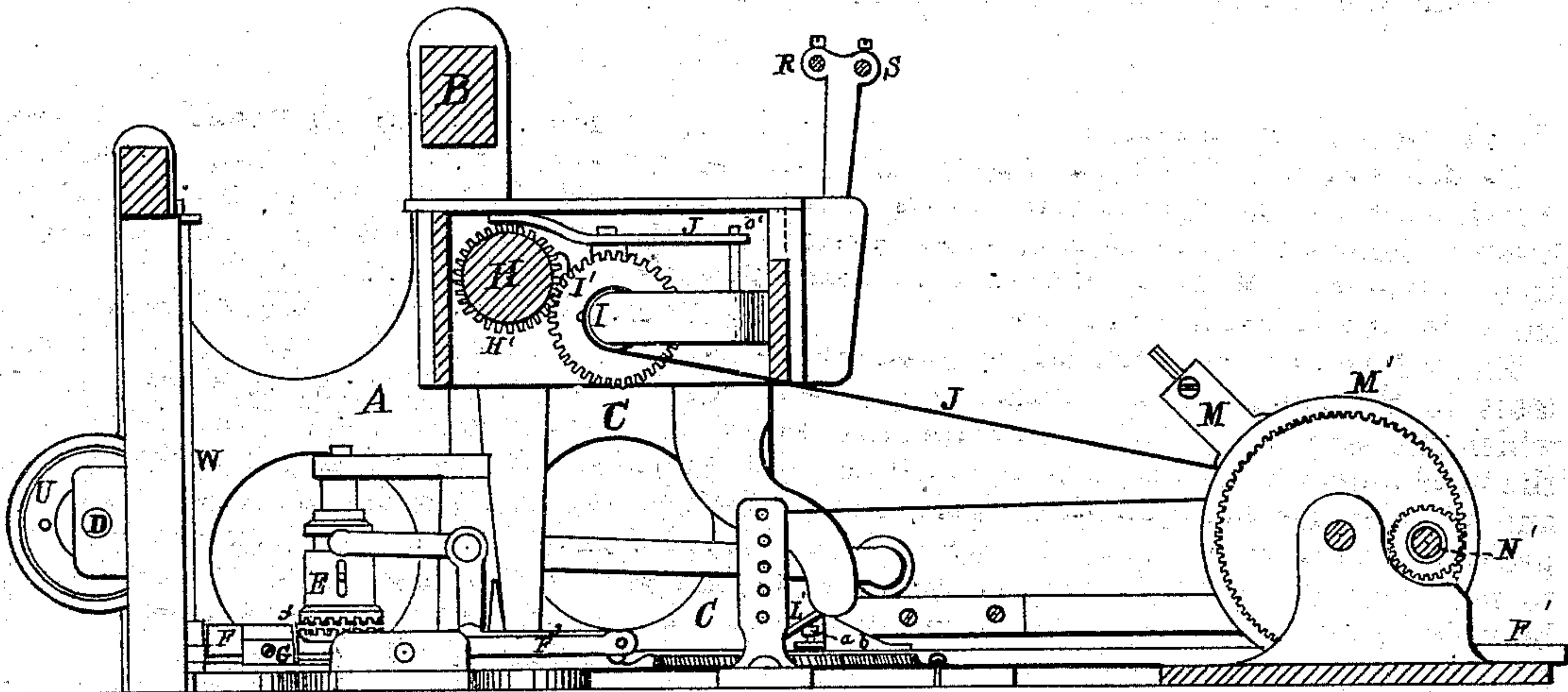


FIG. 3

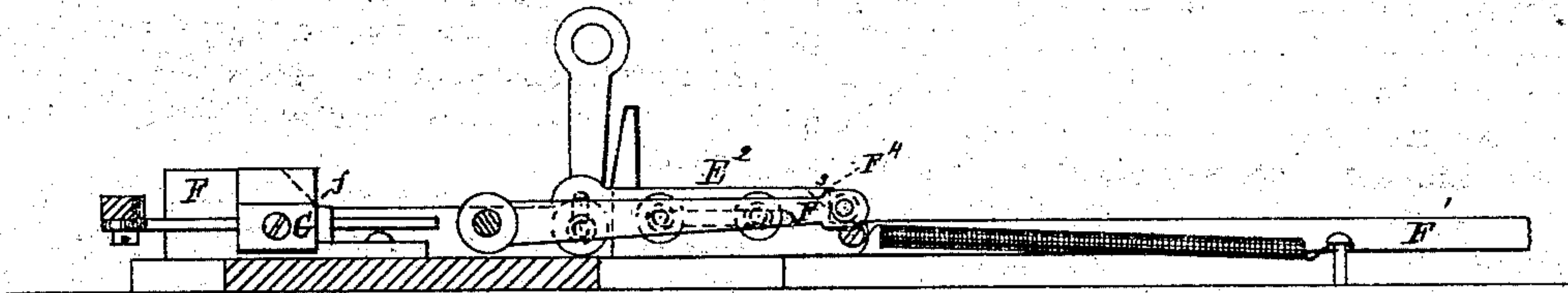


FIG. 5.

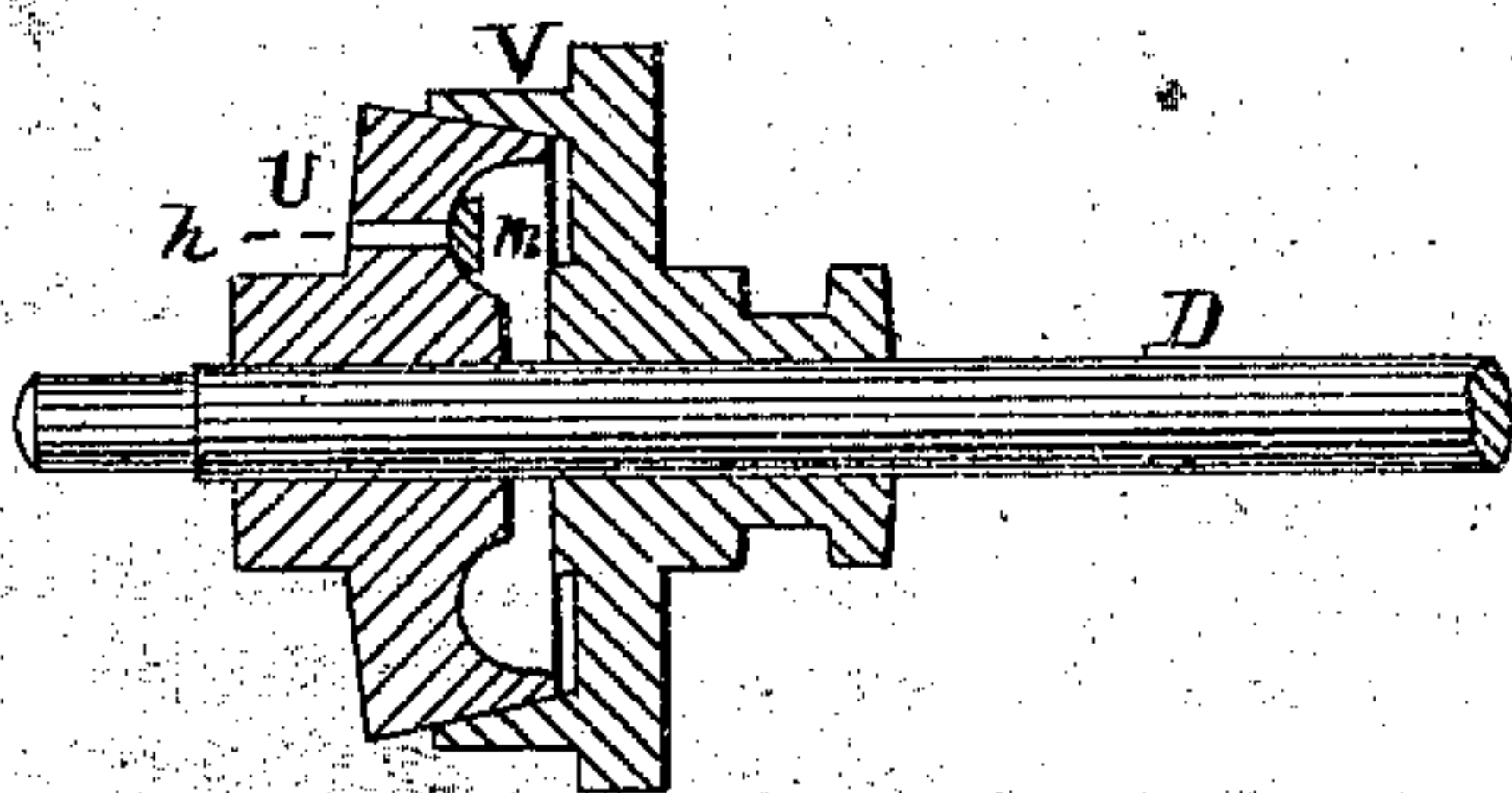


FIG. 6.



FIG. 4.

Witnesses  
N. C. Lombard  
W. C. Hibbard

Inventor  
Peter McGovern



# UNITED STATES PATENT OFFICE.

PETER MCGOVERN, OF NORTH ANDOVER, MASSACHUSETTS, ASSIGNOR TO  
GEORGE L. DAVIS, JOHN A. WILEY, JOSEPH M. STONE, GEORGE G.  
DAVIS, JOSEPH H. STONE, AND JAMES H. DAVIS, OF SAME PLACE.

## IMPROVEMENT IN SPINNING-MULES.

Specification forming part of Letters Patent No. **153,975**, dated August 11, 1874; application filed  
November 6, 1873.

*To all whom it may concern:*

Be it known that I, PETER MCGOVERN, of North Andover, in the county of Essex and State of Massachusetts, have invented certain Improvements in Mules for Spinning, of which the following is a specification:

The subject-matter of my improvements relates to the construction of the devices by which the several movements are imparted to the mechanism in a mule or jack for spinning; and some of said improvements have more especial reference to the spinning-jack patented to me April 18, 1871, No. 113,784, which will be referred to in this description to explain their operation; and some of them are applicable to other forms of self-operating mules or jacks for spinning.

My first improvement relates to the mechanism by which the shipper of the running-out scroll is operated so that its movement of engagement will be under the control of the main shipper instead of the floor-rod, by which it was done in my aforesaid Patent No. 113,784; and consists in combining with the shipper-lever of the running-out scroll a catch or lock that is withdrawn by the action of the main shipper instead of the floor-rod, which disengages said clutch when the carriage is run out, by which arrangement the outward movement of the carriage is more accurately timed to the other movements of the machine.

My second improvement relates to the method of operating the said floor-rod which works the said clutches of the running-out scroll and the drawing-in gear; and consists in connecting the said rod with the slide or other device that works the said clutches by a sliding connection, which permits the rod to move lengthwise a certain distance before it moves the slide; and in combining with the slide or equivalent a spring to draw the same forward, and a latch or other detent to hold it in a forward position, and an incline or its equivalent upon the rod that will raise the latch when the rod has been drawn forward to a determined point, and allow the slide to move forward, and thus cause the clutches to be operated instantly, as will be more particularly described.

My third improvement relates to the manner of connecting and disconnecting the winding mechanism to and from the main drum of the spindle-carriage by the action of the latch-rod that works the faller; and consists in making such connection by means of a clutch upon said drum, which is worked by the rocker-shaft in the spindle-carriage, which is marked *o* in my aforesaid Patent No. 113,784, or by other equivalent intermediate mechanism, by which the engagement and disengagement of the winding mechanism are produced by the operation of the latch-rod or its equivalent instead of the drum and winding-gear by frictional devices, as was before done.

My fourth improvement relates to the construction of the coping-rail (so called) which guides the faller in the building of the bobbin or cop; and consists in combining with the inner end of the rail a short projecting incline, which has the effect to give to the faller a short downward movement while guiding the yarn upon the point of the bobbin to bind the yarn upon the same, which is called the ducking movement, the details of which will be described.

My fifth improvement consists in the combination, with the faller-shaft, of an inclined bar, which is mounted upon an arm thereof, by the operation of which the counter-faller is released and raised under the yarn gradually without a shock, as will be described.

My sixth improvement consists in combining with the friction-cones which drive the spindles backward to back off the yarn an air-cushion or inclosed space for confining the air, and a vent, by which their engagement is made less sudden, a shock is avoided, which occurs when the engagement is instantaneous, and their disengagement is properly effected.

In the drawings, Figure 1 is a sectional elevation. Fig. 2 is a plan. Fig. 3 is a sectional elevation, looking in the opposite direction to Fig. 1; and Figs. 4, 5, and 6 are details of detached parts.

A part only of the machinery of a mule or jack is shown, sufficient to show the application of my improvements thereto, the remainder being constructed in any usual way.



A is the frame of the machine; B, the roller-beam; C, the spindle-carriage; D, the main driving-shaft; all constructed in the usual way, or as are shown in my aforesaid patent. E is the clutch for driving the drawing-in pinion  $E^1$ , which works in the rack on the gab-rod, which draws in the spindle-carriage while the "head-twist" is being put in. The teeth of this clutch are made of the form shown enlarged in Fig. 4—that is, with the opposite sides nearly parallel—to prevent them from being thrown out of engagement when subjected to strain in an opposite direction to their usual motion, to which they are liable in backing off when the teeth are simply inclined on the back side. F is the floor-slide, by the incline  $f$  of which the shipper-lever of the clutch of the running-out scroll is raised when the slide is drawn forward, as was before done, to stop the outward movement of the spindle-carriage; but, instead of putting the clutch into gear by the reversed movement of the slide F, as before done, a block or catch, G, is used in connection with it, which is connected with and operated by the shipper-shaft W, as shown, which is slipped under the end of said shipper-lever when raised, and holds the lever up until the said block is withdrawn by the action of the shipper coincident with the other operations controlled by it. The slide F is connected with the long floor-rod  $F^1$  by a sliding connection at  $E^2$ , as shown in Fig. 5, which permits the rod to move a short distance lengthwise without moving the slide. The slide is drawn toward the front by the spring  $F^2$ , and is also provided with a latch or detent,  $F^3$ , which catches and holds the slide F by a shoulder,  $F^4$ , when it is pushed back by the floor-rod. This latch is provided with a pin,  $f^1$ , which projects over the floor-rod, as seen in Figs. 1 and 5, and the floor-rod is provided with an incline,  $f^2$ , which, as the rod is drawn to the front, takes under the pin  $f^1$ , and raises the latch from the shoulder  $F^4$ , and allows the slide F to fly forward by the action of the spring  $F^2$ , and instantly disengage the running-out scroll and put in gear the drawing-in clutch E.

This improved construction is to obviate the difficulty of the slowness of the movement given to the floor-rod by the carriage at the time that these two operations are required, and renders them instantaneous. The floor-rod  $F^1$  is moved by the spindle-carriage, as was before done. H is the main drum, which drives the spindles. I is the winding-drum, which is driven by the chain J in the usual way, and, by the gear  $I^1$ , drives the drum H through the gear  $H^1$ , which runs loosely upon its shaft. The gear  $H^1$  is made to engage with the drum-shaft by means of a clutch,  $H^2$ , the hub of which is provided with a groove, as shown, and is worked by a lever,  $J'$ , which is worked by an arm,  $o'$ , upon the rocker-shaft  $o$  before mentioned. The upper end of the arm  $o'$  works upon the incline  $j$  at the outer end of the lever  $J'$ , and, by its vibrations back and forth, im-

parts a lateral movement to the lever, sufficient to operate the clutch  $H^2$ , the lever being held against the arm  $o'$  by the spring K. The position of this arm  $o'$  on the rocker-shaft  $o$  (shown in the drawing) is that which it would occupy when the latch-rod of the faller (not shown) was upon the pin  $l$ , which was upon the coping-rail L, the latch-rod being connected with an arm extending downward from the shaft  $o$ , as is shown in Fig. 6 of the aforesaid Patent No. 113,784, which swings the arm  $o'$  to the front, as shown, and allows the spring K to throw the clutch  $H^2$  into engagement in the condition to wind up the yarn.

When the carriage has run in, the latch-rod is knocked off of the pin  $l$ , and, by that act, turns the rocking-shaft  $o$ , so that the upper end of the arm  $o^1$  moves toward the drum H, and, acting upon the incline  $j$ , moves the lever  $J'$  laterally, and withdraws the clutch  $H^2$ , and leaves the drum H at liberty. Thus the engagement and disengagement of the winding mechanism are made to depend upon the action of the faller, instead of frictional devices operated by the movements of the main and winding drums, as was the usual mode of construction.

The coping-rail L, which is mounted generally in the usual way, has attached to its inner end a secondary movable incline,  $L'$ , which is hinged to the end of the rail, as shown, and, when the rail is below its highest position, the incline  $L'$  projects above the general line of the surface of the rail, as is shown in Fig. 1; but when the rail is in its highest position the incline falls down, so that its upper surface does not project above the surface of the rail, for the reason that the free end of the incline rests upon an adjusting-screw,  $a$ , in the sliding shoe  $b$ , by which the rail is raised and lowered, as usual, by resting upon its inclined surface. The purpose of this secondary incline  $L'$  is to give the faller a short downward movement just before the carriage is at its inward limit of the point of movement, called the "ducking motion," to reverse the direction of winding, for a moment, upon the point of the cop or bobbin, during the last part of its formation, to make it firmer. M is the radial arm of the winding mechanism. It is mounted on a wheel,  $M'$ , and is driven by a cord from the carriage, which winds upon the drum N upon the pinion-shaft  $N'$ , which drives the wheel  $M'$  in the usual manner. The arm M is provided with a sliding block, P, adjusted by a screw,  $P'$ , which is worked under the control of the counter-faller, as has been before done. The block P is provided with a sheave, Q, around which the winding chain passes, as shown, the end of the chain being attached to some fixed point on the winding-drum, so that the sheave is in the loop of the chain so formed, and the effect produced upon the winding-chain by the movement of the radial arm is twice as great as it would be if the chain were attached directly to the block in the usual way.



By this arrangement the radial arm is required to be but one-half of the length that is required when the chain is attached to the block P, as is usual; and this part of the machinery can thereby be made so low that the spindle-carriage can pass over it. R is the faller-shaft, and S is the counter-faller shaft, constructed and operated, mainly, as usual, excepting the mechanism for locking and regulating the movement of the counter-faller. Upon the faller-shaft is an arm, R<sup>1</sup>, extending upward, and to its upper end is jointed the curved bar or incline R<sup>2</sup>, the free end of which rests upon the counter-faller shaft S, as shown. T is the counterpoise of the counter-faller, which is connected with the same by the rod T<sup>1</sup>, as usual. It also has another rod, T<sup>2</sup>, which extends upward between the faller-shafts, and is provided with a roller, T<sup>3</sup>, at its upper end, which rests upon the bar R<sup>2</sup> of the faller, as shown in Fig. 1, in the position which they occupy when not in operation. In this position of the parts the arm upon the faller holds up the counterpoise T, and prevents the counter-faller from touching the yarn; but when the faller is depressed, the upper end of the arm R<sup>1</sup> and incline R<sup>2</sup> move out from beneath the roller T<sup>3</sup>, which descends along the upper surface of the bar or incline R<sup>2</sup>, and gradually brings the counter-faller into action without a shock. U and V are the friction-cones for giving the backing-off movement, as usual, one or both of which are usually made with arms; but in this case the centers are made with disks, so as to form an inclosed space between them, as seen in Fig. 6, to make an air-cushion, to prevent the shock of a too sudden engagement, which was produced in my previous machines by the cones being thrown into engage-

ment by a spring-shipper. This resistance is adjusted by making a hole, *h*, in one of the disks of the proper size, or providing it with a valve, *m*, upon the inside, which resists the escape of the air, and allows the cones to be separated without forming a vacuum between them; but, in practice, I have found that, by the use of the hole *h* alone, of the proper size, the objectionable shock is prevented.

What I claim is—

1. The catch or block G, for holding the shipper of the running-out scroll, in combination with the main shipper-shaft W, substantially as described.

2. The combination of the latch F<sup>3</sup> with the floor-slide and its spring and the incline *f* of the floor-rod, or their equivalents, co-operating substantially as described.

3. The combination of the clutch H<sup>2</sup> on the main drum with the latch-rod, or its equivalent, which operates the faller by means of the rocker-shaft *o* and its accessories, or their equivalent, substantially as described.

4. The secondary piece L', in combination with the coping-rail L, for producing the ducking motion of the faller, substantially as described.

5. The inclined bar R<sup>2</sup> and arm R<sup>1</sup> upon the faller-shaft, or its equivalent, in combination with the mechanism for operating the counter-faller, substantially as described.

6. The backing-off cones, constructed as described, to form an air cushion and vent, for the purpose specified.

Executed October 29, 1873.

PETER MCGOVERN.

Witnesses:

N. C. LOMBARD,  
WM. C. HIBBARD.