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P. McGovern,

Shinning Jack.

No. 113.784 Patented Apr. 18. 1871.

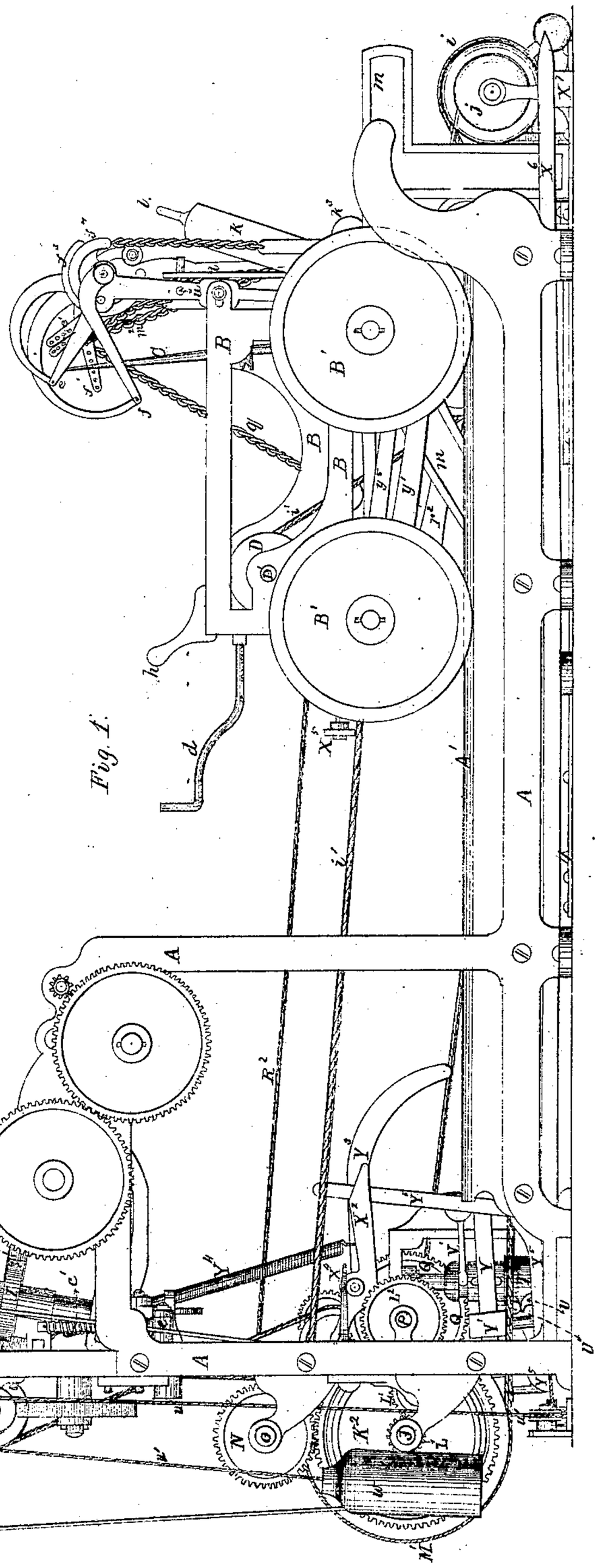


Fig. 1.

Witnesses.

N. C. Lombard

G. E. Whitney

Inventor.

Peter Mc Govern

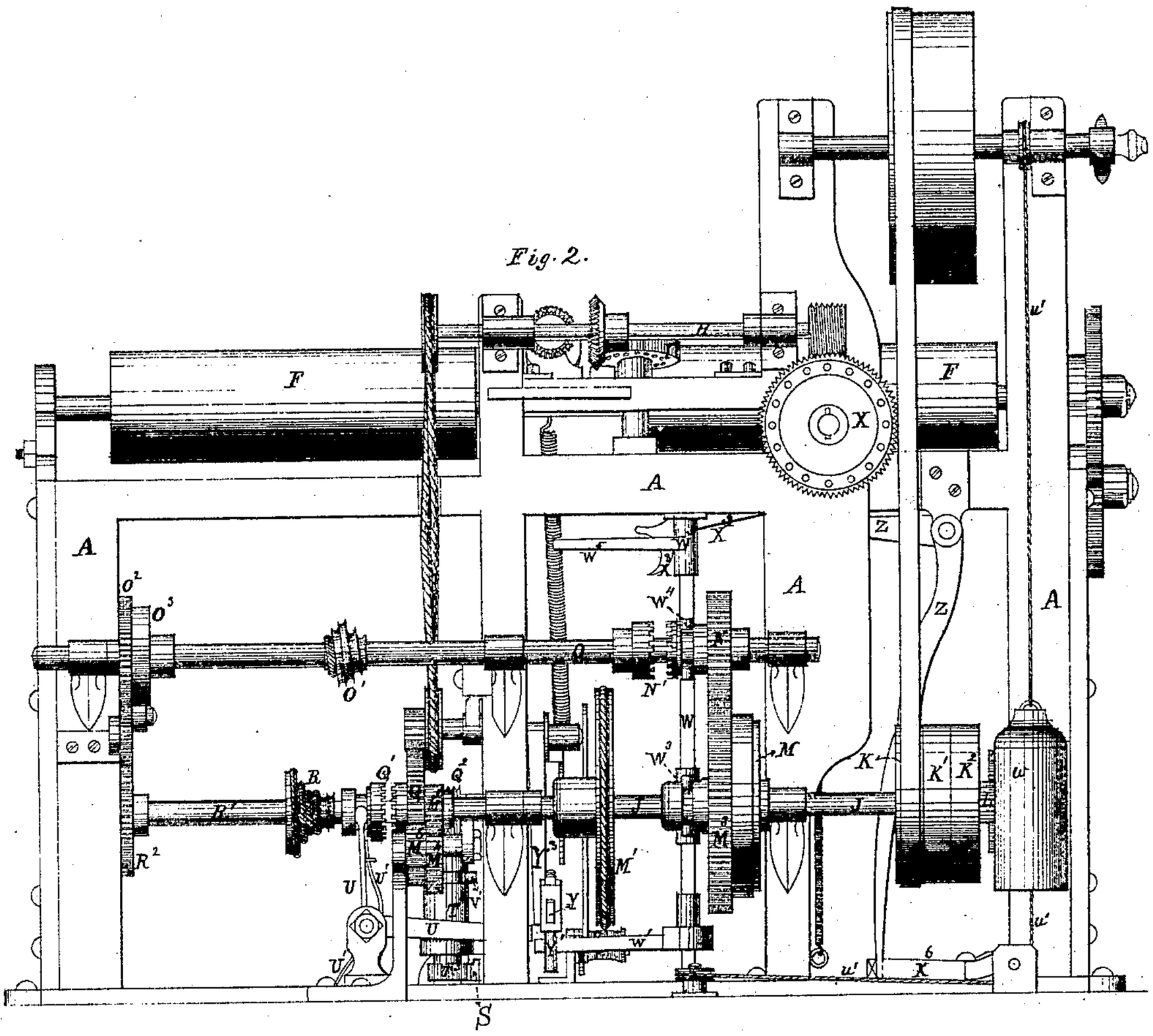
P. McGovern,

5. Sheets. Sheet. 2.

Spinning Jack.

No. 113,784. Patented Apr. 18. 1871.

Fig. 2.



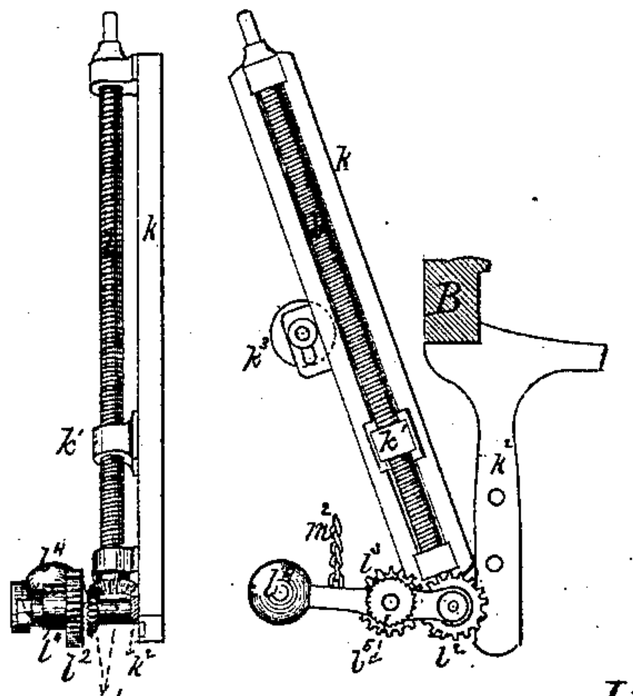


Fig. 9. Fig. 8.

Witnesses.

N. C. Lombard

G. B. Whitney

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5. Sheets. Sheet. 3.

P. McGovern,

Spinning Jack.

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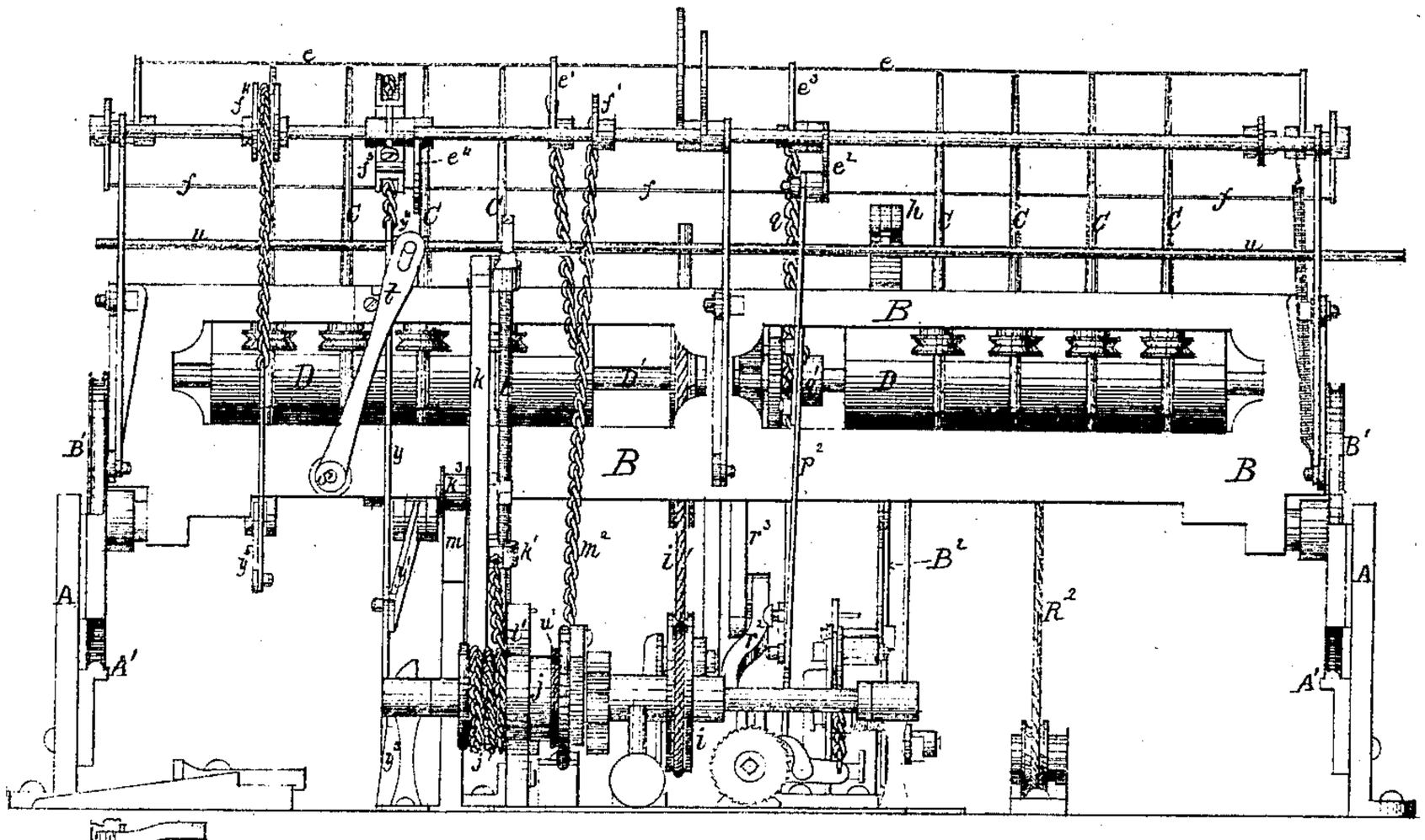

Fig. 3.

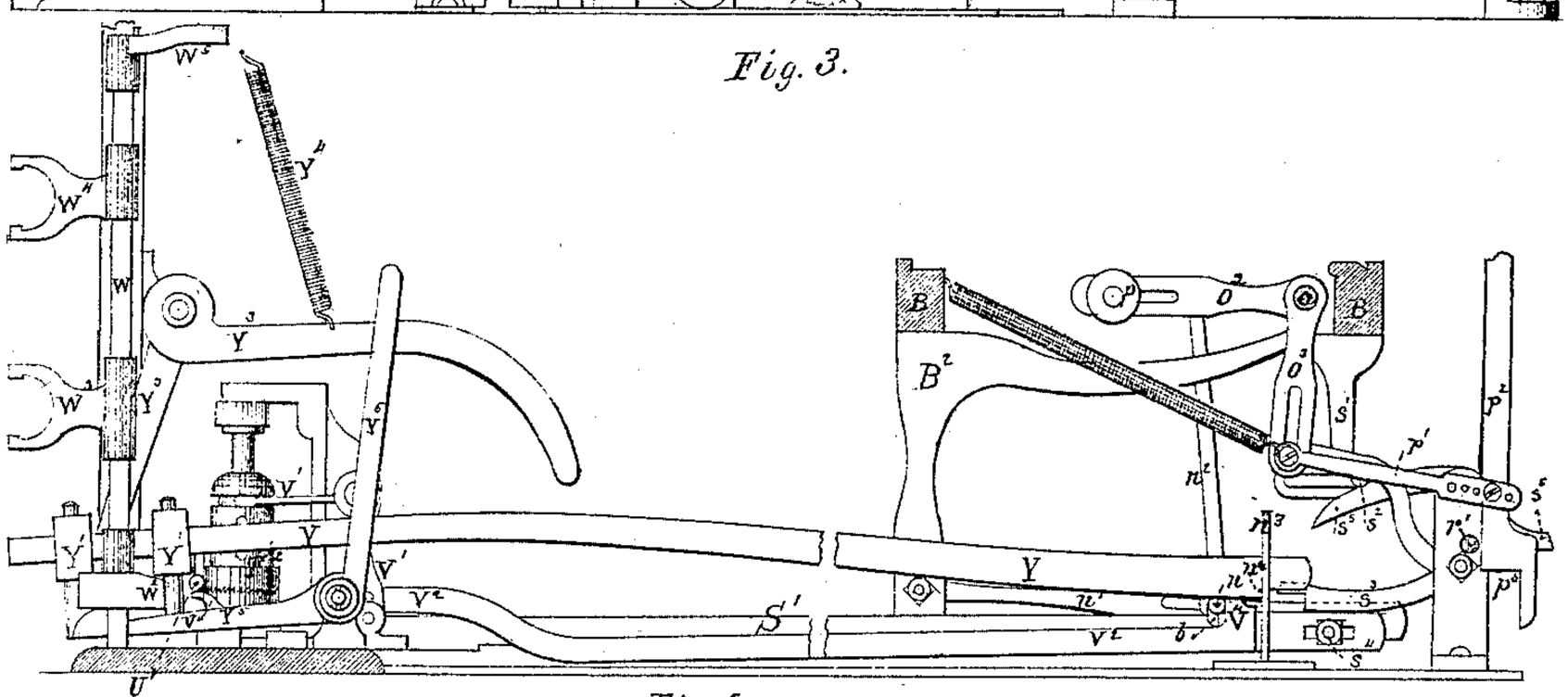

Fig. 6.

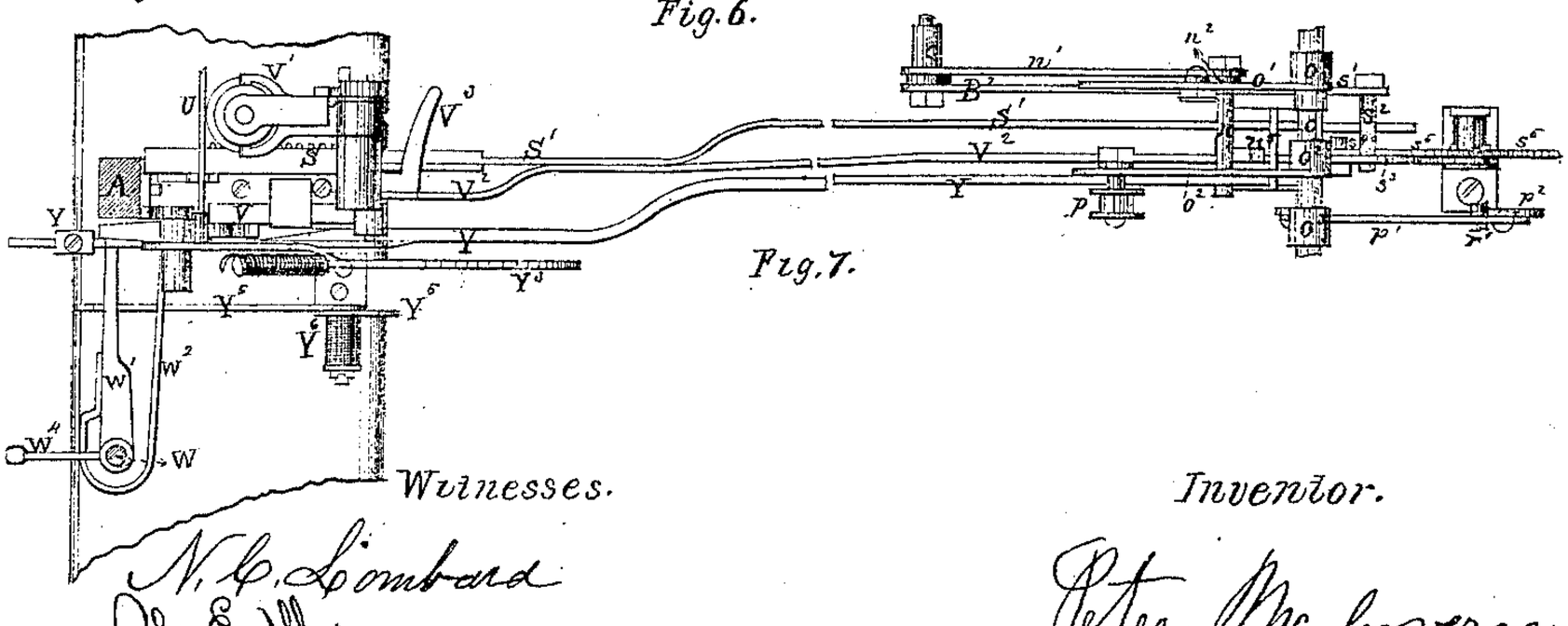

Fig. 7.

Witnesses.

N. C. Lombard

D. E. Whitney

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P. McGovern,

5. Sheets Sheet 4

Spinning Jack.

No. 113,784. Patented Apr. 18, 1871.

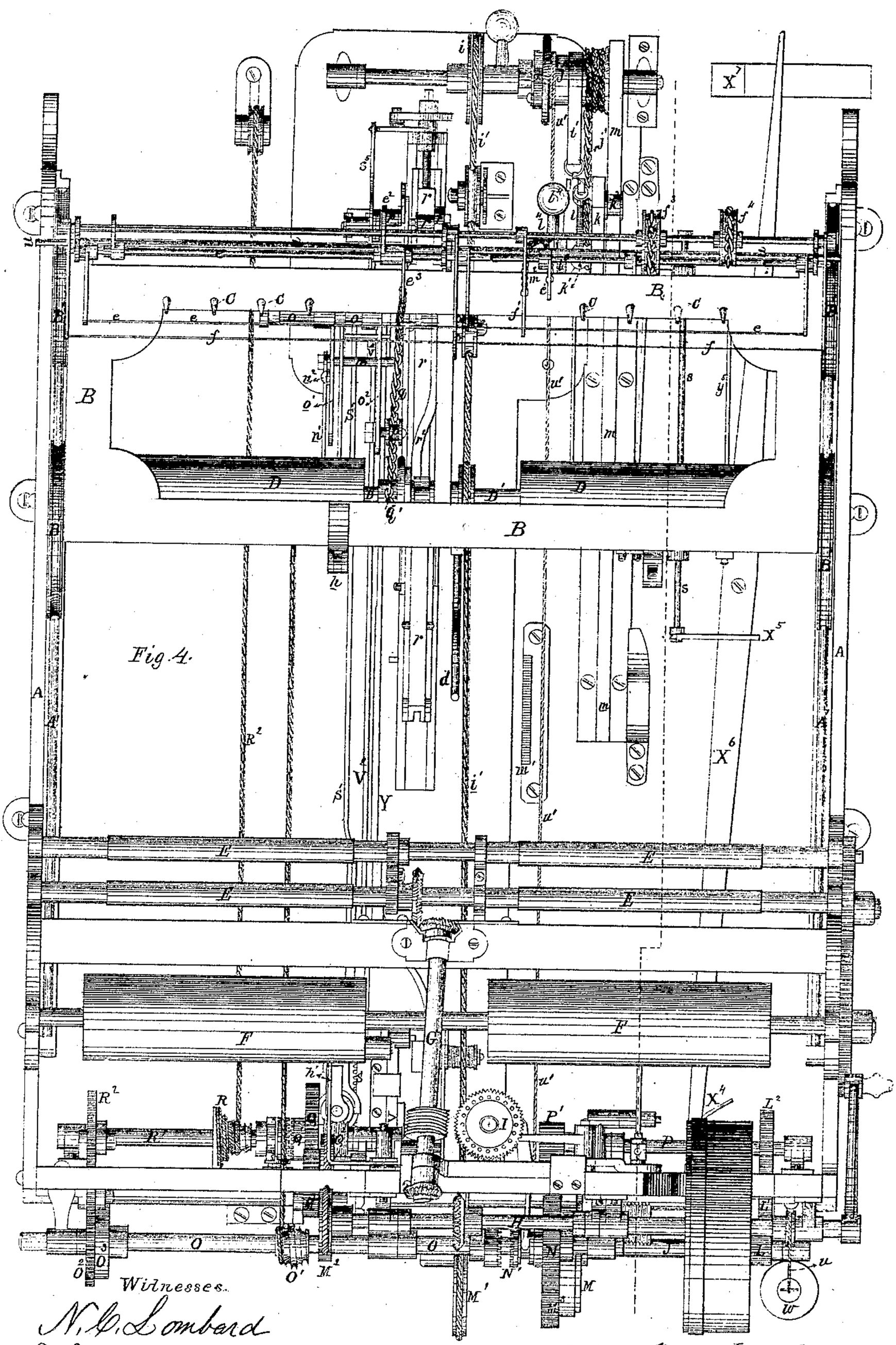

Fig. 4.

Witnesses.

N. G. Lombard

G. B. Whitney

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Peter McGovern

5. Sheets, Sheet. 5.

P. McGovern.

Spinning Jack.

No. 113,784. Patented Apr. 18. 1871

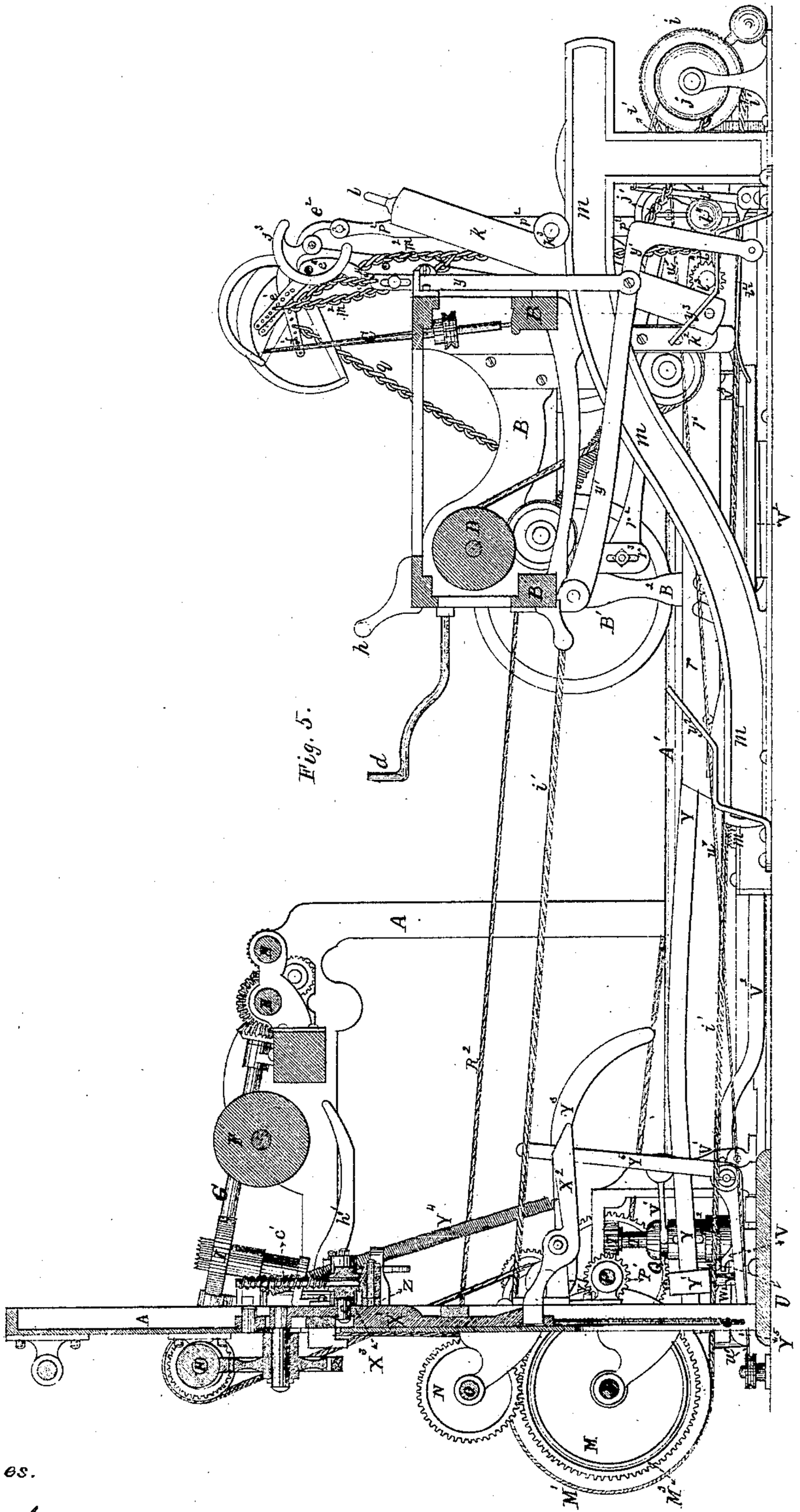

Fig. 5.

Witnesses.

N. C. Lombard

G. E. Whitney

Inventor.

Peter McGovern

United States Patent Office.

PETER McGOVERN, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO GEORGE L. DAVIS, JOHN A. WILEY, JOSEPH M. STONE, GEORGE G. DAVIS, JOSEPH H. STONE, AND JAMES H. DAVIS.

Letters Patent No. 113,784, dated April 18, 1871.

IMPROVEMENT IN SELF-ACTING JACKS FOR SPINNING.

The Schedule referred to in these Letters Patent and making part of the same.

I, PETER McGOVERN, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain Improvements in Jacks for Spinning, of which the following is a specification.

My improvements relate more particularly to the construction of jacks for spinning wool which are what is called "self-acting," in which the several operations in spinning are performed automatically, by which the mechanism is simplified and adapted to be applied to jacks already constructed to work by hand without great alterations, and to be worked by a single driving-belt applied to the main driving-shaft of the machine.

As the several points of improvement relate mainly to the manner of constructing and arranging the subordinate parts of the machine they will severally be explained in connection with their description.

Description.

In the drawing—

Figure 1 is an elevation of one end of the machine;

Figure 2 is an elevation of the back side;

Figure 3 is an elevation of the front side of the carriage and mechanism at that side of the machine;

Figure 4 is a plan of the machine;

Figure 5 is a transverse vertical section; and

Figures 6, 7, 8, and 9 are details that will be referred to in the description.

In the following description that side of the machine at which the driving-gearing is situated will be called the back side, and the opposite side the front or forward side, and those parts of the machine which are old and not modified by my improvements will be merely mentioned by name without further description.

A is the frame-work of the machine.

B is the carriage, mounted upon carrying-wheels B^1, which run upon the rails A', attached to the frame or otherwise.

C C are the spindles driven from the drum D, all in the usual way.

E E are the roller-jaws, and

F F are the drums to carry the bobbins of roping, connected by gearing, as shown, and driven by the inclined shaft G from the shaft H, with a counter or clock, I, to throw the shaft G out of gear to determine the delivery of the roping, all in a well-known manner.

J is the driving-shaft of the machine, which carries the driving-pulley K fast upon it, and the pulley K^1, which runs loosely upon it, having a long hub or quill, which, upon the outer end, carries the pinion L and the loose pulley K^2, which runs loosely upon the outside of the hub of K^1 to stop the machine.

The shaft J also carries the friction-clutch cone M, for backing off, the race-pulley M^1 for driving the spindles, and the pinion M^2 for driving the train of gearing by which the carriage is drawn out, the roping delivered, and the carriage drawn in to relieve the twist, all of which are fast upon it; and the gear M^3, having a hollow cone which works with the cone M to back off, which runs loosely upon the shaft J and engages with the gear N, which runs loosely upon the shaft O, and which, by the clutch N', carries the shaft O and scroll O', by which the carriage is run in.

The pinion L through the intermediate gear L^1 carries the gear L^2 on the back shaft P, upon the opposite end of which is the pinion P', which engages with the gear M^3 and furnishes the motion to back off and run in the carriage from the pulley K^1.

The pinion M^2 engages with the intermediate gear M^4, which carries a pinion, M^5, that engages with the gear Q, which, by means of the clutch Q^1, drives the scroll R upon the shaft R^1, which draws out the carriage by the cord R^2, as is shown.

The gear Q runs loosely upon the shaft R^1, and to it is attached the worm Q^2, which works in a small wheel, T, upon the top of the vertical shaft T^1, which, by the clutch T^2, drives the pinion T^3, that runs loosely on the shaft at the bottom and works in a rack, S, on the long rod S', which reaches nearly to the front of the machine, and is provided with a gab or hook, *b*, which engages with the pin *n* upon the carriage, as will be described, and thereby draws in the carriage a short distance during the putting in of the twist to compensate for the shortening of the yarn.

U is a bent lever for working the clutch Q^1, the horizontal arm of which rests at its inner end upon an incline upon the back end of the slide V.

The forward end of the slide is jointed to the lower arm of the bent lever V^1, which works the clutch T^2. To this arm also is jointed the long rod V^2, which operates both the clutch and slide and reaches to the front part of the machine. Its front end is provided with an arm or hook, V^4, upon its upper side, which engages with the pin *n* upon the carriage, by which the rod V^2 is drawn forward at the last part of the outward movement of the carriage, and thereby drawing the incline upon the slide V under the arm of the lever U, raises it and throws out the clutch Q^1 and stops the drawing-out scroll R, and also, by the same movement, throws into engagement the clutch T^2 of the drawing-in mechanism.

This rod is pushed back by the bracket B^2 upon the carriage, coming in contact with the arm V^3 upon the rod V^2 at the last part of its inward motion, which thereby pushes back the slide V and removes the incline from beneath the arm of the lever U, and allows

it to fall by gravity and the force of the spring U′, which throws the clutch Q^1 into gear, and at the same time, by the bent lever V^1, throws the clutch T^2 out of gear, putting the parts in a condition to commence the draft.

W is the shipper-shaft, which controls the movements of the mechanism for running in and stopping the carriage and the backing off. It is set vertical, and has at the bottom near the floor the arm W^1 and a stiff leaf-spring, W^2, attached to it, as is shown.

Next above this is the forked arm W^3, that slides the gear M^3 on its shaft.

Above this is the forked arm W^4, that slides the gear N.

Above this is the double arm W^5, which co-operates with the latch X^3, which is controlled by the twist-counter or clock X.

The outer end of the arm W^1 and spring W^2 are embraced by two stops, Y^1 Y^1, upon the long rod Y, which extends to the front of the machine. Its back end is suspended upon the lower end of the bent lever Y^3, the other arm of which, toward the carriage, is curved downward, so that the carriage when it runs in slides over the lever and depresses it, drawing back the rod Y against the tension of the spring Y^4, which draws the curved arm of the lever Y^3 upward.

Before the carriage begins to depress the lever Y^3 the arm W^1 will be engaged with the hook of the detent or latch Y^5, which is in the form of a bent lever, as is shown, and its catch is forced upward toward the arm W^1 by the coiled spring Y^6 upon its axis. This holds the arm W^1 fast while the depression of the lever Y^3 by the carriage draws the rod Y back, bending the spring W^2 until a catch upon the forward end of the rod falls below its bearing in the standard in which it slides, which locks the rod and prevents it from returning, thus setting the spring W^2 and preparing it for its future action, as will be described.

The clock or counter X is mounted upon a slide, X^1, in the usual manner. It is raised by means of the lever X^2, having an incline upon its upper side at its forward end, upon which the carriage acts to depress it at the last part of its inward motion. This arrangement gives a much easier movement to both the slide and carriage than that usually adopted for that purpose.

Upon the inside of the slide X^1 is fixed a stud, *c*, which works in a slot in one arm of the latch X^3, and also engages with the horizontal arm of the shipper Z. This engagement is by means of a rod with a shoulder below, which extends up through the stud *c* some distance and has a spiral spring, *c′*, upon it, which rests upon the stud and has a collar above it made fast to the rod. By this means the shipper may be moved outward to throw the belt onto the loose pulley K^2 to stop the machine by compressing the spring *c′* without moving the slide X^1.

Upon the inner side of the shipper, toward the front, is fixed a bent arm, X^4, which is operated by the swinging arm X^5, which is mounted upon a shaft, *s*, upon the carriage.

To the opposite end of this shaft is attached an upright arm, *t*, the top end of which is connected with the long rod *u*, which extends the entire length of the carriage.

When the machine is at work the arm X^5 is swung upward so as to pass over the arm X^4 on the shipper and not come in contact with it; but when the operator desires to stop the machine, by sliding the rod *u* lengthwise to the left the arm X^5 is lowered so as to come in contact with the bent arm X^4 and crowd the shipper laterally so as to throw the belt onto the loose pulley K^2 and stop the machine in the proper position to mend up—that is, a little before it finishes its inward motion.

When the machine is to be started the rod *u* is drawn in the opposite direction, which swings the arm X^5 out of contact with the arm X^4, and allows the spring *c′* to move the shipper to the position to lead the belt onto the pulley K, and continue the operation of the machine.

An arm upon the lower end of the shipper Z is extended down near the floor, and against the inner side of this the long lever X^6, which lies upon the floor, works. This lever has its fulcrum near the middle, and extends to the front of the machine, as shown.

By means of this the belt may be thrown off at any time by the operator, the spring *c′* upon the shipper permitting such action, and the lever is held in that position by the catch X^1 upon the floor.

Upon the outer ends of the scroll-shafts R^1 and O are gears R^2 and O^2, which are connected by two intermediate gears. The gear O^2 runs loose upon its shaft, and is connected therewith by a coiled spring inclosed in the box O^3. The purpose of this arrangement is to use two cords only with single scrolls to work the carriage, by which the winding up of one cord will unwind the other, the cords being kept tight on the scrolls by the tension of the coiled spring in the box O^3. But this arrangement is not of my invention.

On the carriage is an arm, *d*, which strikes against the shipper-arm W^5 and insures the throwing out of the drawing-in clutch N′ on the gear N when the carriage runs in.

e is the main faller, and

f is the counter-faller.

h is the roller and stand for working the lever *h′* that throws the shaft G into gear to deliver the roping.

The pulley *i* carries the main driving-band *i′* at the front, and is arranged as shown, and the winding-on drum *j*, with its accessories, is connected with it in the usual manner.

The chain *j″*, which operates this drum, is attached to a sliding block, k^1, on the radial arm *k*, which hangs upon a bracket, k^2, upon the carriage, as shown, and is provided with a screw, *l*, and gearing to operate the block in the usual way, excepting as will be described.

The radial arm *k* carries a roller, k^3, which works on the upper surface of a long curved bar, *m*, to give the requisite motion to the arm as the carriage runs back and forth.

This bar and the arm are so arranged and the co-operating parts are so proportioned to each other that the bar can be placed beneath the carriage without any modification of the carriage from its usual construction in a hand-jack. This is a matter of great importance in converting a hand-jack into a self-acting jack.

The screw *l*, seen more clearly in figs. 8 and 9, is operated by a pair of bevel-gears, l^1, at the bottom, to the axis of one of which is attached a small spur-gear, l^2, which meshes into another spur-gear, l^3, the axis of which is carried by a horizontal vibrating lever, l^4.

This axis also carries a ratchet-toothed gear, l^5, which, as the carriage runs in, engages with the piece of ratchet-toothed rack m^1, which is fastened to the floor.

The lever l^4 is suspended by the chain m^2 from the arms e^1 and f^1 of the faller and counter-faller, respectively, so that, when the winding-on is too fast, the counter-faller is drawn down by the yarn and lowers the gear l^5 so that it will engage with the rack m^1 as the carriage runs in and through the gearing just described, turn the screw *l*, and adjust the block k^1 in the usual way.

B^2 is a bracket, which is secured to the under side of the carriage B, extending downward nearly to the floor. To the lower end of this is jointed the horizontal arm n^1, the opposite end of which carries the long stud *n*, and is suspended by the rod n^2 from the arm o^1 of the rocker-shaft *o*.

The rocker-shaft *o* is mounted upon the inside of

the carriage B, and has another horizontal arm, o^2, and a vertical arm, o^3.

The arm o^2 at its outer end carries the grooved roller p, and the arm o^3 at its lower end is, by the connecting-rod p^1, attached to the latch-rod p^2, which leads up to an arm, e^2, on the faller-shaft e, to operate the faller.

The rocker-shaft o is operated by the chain q, one end of which is attached to the arm e^3 on the faller-shaft e, and the other end is wound upon the pulley q', which runs loosely upon the drum-shaft D', and is revolved, when the drum turns backward, to back off the yarn, the chain in its course passing down beneath the pulley p, as is shown, and, as it tightens, draws the arm o^2 upward.

The stud n co-operates with several other parts, and performs very important functions. It engages with the gab b in the rod S^1 when the stud is lowered, drawing forward the rod, and is the means of communicating the drawing-in motion to the carriage from the pinion T^5, and releasing it at the proper time by being raised, as described, so that the carriage can be run in without disturbing the rod. It also draws forward the rod V^2 to throw out the running-out clutch Q^1 and throw in the drawing-in clutch T^2. It also raises and unlatches the front end of the rod Y to allow the spring Y^4 to throw it forward, moving the shipper W so as to disengage the friction-clutch M and stop the backing-off.

r is the copping-rail, upon which the stud r^1 runs to operate the faller e and shape the cop. This stud is secured in the end of the swinging arm r^2, the opposite end of which is jointed to the bracket r^3, which is attached to the under side of the carriage, as shown.

The stud r^1 extends out sufficiently to engage with the latch or shoulder p^3 on the lower end of the latch-rod p^2, by which the faller is moved.

The mechanism shown, by which the copping-rail is raised and lowered, is not materially different from what has been before used for that purpose.

s^1 is a bracket, which is attached to the under side of the carriage and carries the stud s^2, which, as the carriage runs out, raises the latch s^3 from the pin s^4 to disengage the rod V^2 and allow it to be drawn forward, and also works the lever s^5, which operates the ratchet that lowers the copping-rail.

t^1 is a brake-strap on the drum j, which is worked by the bent lever t^2, which is in turn worked by the lower end of the bracket k^2 to tighten it.

u^1 is a cord wound upon the drum j to wind on the chain j', and which is led back around pulleys to a convenient place and attached to the weight w, which operates it in the usual way.

Upon the counter-faller shaft is fixed a sector, f^3, upon which a chain works which is attached to the vertical rod y, which leads down to the lever y^1.

On the lower extremity of this lever is a roller which runs under the fixed cams y^2 and y^3, attached to the floor, and prevents the rising of the counter-faller unduly at the time of backing off, and running up the yarn to the points of the spindles.

Upon the faller e is a locking-arm, e^4, which swings over a shoulder, y^4, on the rod y, and holds the counter-faller from rising too high while the draft is being made, but leaves it free while winding on the yarn.

The counter-faller is held up by the sector f^4 and chain leading to the lever y^5, which is weighted sufficiently for that purpose.

Some of the parts shown are not described, as they are substantially such as have been used before.

The mode of operation of the machine is as follows:

Let the carriage be supposed to be run in to the position for winding up the yarns and the machine at rest, the driving-belt running upon the loose pulley K^2, being held there by the arm X^5 on the carriage, which acts upon the arm X^4 upon the shipper Z, as has been described.

To start the machine the operator, by sliding the rod u, swings the arm X^5 upward from the arm X^4, which leaves the shipper at liberty to swing inward by means of the spring c', on the rod connecting the shipper with the clock-slide X^1, which throws the belt upon the pulley K^1 to complete the operation of running in the carriage.

During the last part of the movement the carriage will have passed over the lever Y^3, depressing it, and drawing back the rod Y and stops Y^1 until the shoulder at n^4 drops below the slot in the standard n^3, as seen in fig. 6, which locks the rod.

This action of the rod Y compresses the spring W^2 on the arm W^1, because the catch or detent Y^5 prevents the arm W^1 from swinging outward. At this time, also, the roller h will have raised the lever h', which puts the shaft G into gear with the shaft H and its counter I, ready to deliver the roping; also, the lever X^2 will be depressed at its inner end to raise the clock-slide X^1 to put the clock or counter X into gear with the worm-shaft H, and to move the shipper Z so as to throw the belt onto the pulley K; also, the lower end of the bracket B^2 will strike the arm V^3, on the rod V^2, pushing it forward and removing the incline upon the slide V from beneath the outer end of the lever U, which allows it to fall and bring the clutch Q^1 into engagement, ready for running out the carriage. At the extremity of its movement inward the carriage strikes the upright arm of the catch or detent Y^5, depressing the hook from the arm W^1 of the shipper-shaft, which instantly flies back until the short arm of W^5 strikes the detent or latch X^2, turning the shipper-shaft sufficiently for the arm W^4 to disengage the running-in clutch N'. But in case the spring W^2 should fail to operate the shipper and disengage the clutch N', the arm d, on the carriage, would strike the long arm of W^5 and force it back, turning the shipper-shaft so as to disengage the clutch.

As soon as the driving-belt has run upon the pulley K the outward movement of the carriage commences driving the spindles by the pulley M^1 and the running-out scroll R, and the delivery of the roping by the gear M^5 and the trains of gearing which it drives.

When the carriage has reached nearly its outer limit the stud n comes in contact with the stop n^5, on the upper side of the rod V^2, and draws the rod forward and with it the slide V, at the opposite end, bringing the incline upon the slide under the end of the shipping-lever U, which raises it, and throws the clutch Q^1 out of gear and stops the carriage.

The same movement of the rod V^2 operates the shipper-lever V^1 and throws the clutch T^2 into gear to draw in the carriage by the rod S', the gab b of which embraces the stud n to compensate for the shortening of the threads by the twist.

When the requisite twist has been given the clock-slide X^1 is disengaged in the usual way and falls, carrying the short arm of the shipper Z with it, which swings the shipper so as to throw the driving-belt onto the pulley K^1, and also raises the latch X^2, which restrains the short arm of W^5 on the shipper-shaft W, and permits the spring W^2 to throw the shipper-shaft far enough to throw the gear M^3, with the hollow cone, onto the cone M, engaging with it, and giving to the shaft J a motion backward to back off the yarn.

By the backward motion of the drum-shaft D' the pulley q' winds up the chain q, pressing upward the roller p and rocker-arm o^2, and draws down the faller e until the latch-rod p^2, which is attached thereto, rises so high that the shoulder p^3 will pass over the pin r^1, which rests upon the copping-rail r. As soon as this takes place the rod p^2 swings inward the breadth of the shoulder, and, by its connection with the rocker-shaft o through the rod p^1 and arm o^3, allows the rocker-shaft and its several arms to turn a corresponding distance, which, by the arm o^1 and rod n^2, raises the stud n, lifting the rod Y so that its shoulder n^3 is

clear of the standard n^4, and allows it to dart forward by the tension of the spring Y^4, turning the shipper-shaft W, and instantly drawing back the cone-gear M^3, stops the backing off, and at the same time throws into gear the clutch N′ by sliding the gear N on its shaft O, which puts in operation the running-in scroll O^1. The carriage then runs in, winding the cop by the winding-drum, and forming it by the copping-rail, in the usual manner, until the carriage is nearly in, when the lower end of the latch-rod p^2 meets a stop in the frame-work below, which withdraws the shoulder p^3 from the pin r^1 and allows the faller to rise. The machine is then in the condition with which the description of the operation commenced.

The purpose of the brake t^1 upon the winding-drum j is to produce a tension upon the winding-chain and its connections by the drawing-in motion of the rod S′, so that the winding shall commence instantaneously with the running-in motion of the carriage; but as soon as the carriage has moved in a short distance the bracket k^2 will have left the lower arm of the lever t^2, which leaves the brake free.

Claims.

1. The curved bar m and the radial arm k and its accessories, combined with the carriage and winding mechanism, and arranged in the manner described, so that the said bar and radial arm may be placed below the carriage, substantially as described.

2. The combination of the counter-faller with the vibrating weighted lever l^1, pinion l^2, and rack m', for operating the screw in the radial arm k, under the control of the counter-faller, substantially as described.

3. The rocker-shaft s and arm X^5, carried by the carriage, and operating as described, in combination with the arm X^4 on the shipper Z, to stop the machine when the carriage runs in, substantially as described.

4. The combination of the shipper Z with the clock-slide by means of a yielding connection, which will permit the shipper to throw the belt onto the loose pulley to stop the machine, substantially as described.

5. The combination of the lever X^2 with the clock-slide X^1, substantially as described.

6. The combination of the latch X^3 with the clock-slide X^1, substantially as described.

7. Latch X^3, provided with the incline X^8, in combination with the shipper-shaft W, substantially as described.

8. The combination of the arm d on the carriage, with the arm W^5 on the shipper-shaft, substantially as described.

9. The combination of the clutch-lever U with the incline for operating the same, so that the clutch shall be thrown in by gravity or a spring instead of a positive motion, substantially as described.

10. The rocker-shaft o and arms fixed thereon, mounted upon the carriage, and constructed and operating substantially as described.

11. The combination of the stud n, or its equivalent, with the rod Y, substantially as described.

12. The combination of the rocker-shaft o with the latch-rod p^2, substantially as described.

13. The combination of the rocker-shaft o with the stud n or its equivalent, substantially as described.

14. The combination of the rocker-shaft o and its attachments with the pulley q', on the drum-shaft D, and the faller e, by means of the chain q or its equivalent, substantially as described.

15. The combination of the rocker-shaft o, operated as described, the stud n, the latch-rod p^2, and the faller and faller-arm e^3 with the rod S′, substantially as described.

16. The combination of the stud n with the rod V^2 and the bent lever V^1 and slide V, for working the clutches T^2 and Q^1, substantially as described.

17. The combination of the spring W^2 with the arm W^1 on the shipper-shaft W, and the stops Y^1 Y^1 on the rod Y, substantially as described.

Executed December 7, 1870.

PETER McGOVERN.

Witnesses:

N. C. LOMBARD,

G. E. WHITNEY.