Sheet 1-2 Sheets.

W. H. Brothers.

Spinning Jack.

No. 94,278. Patented Aug. 31, 1869.

Fig: 1.

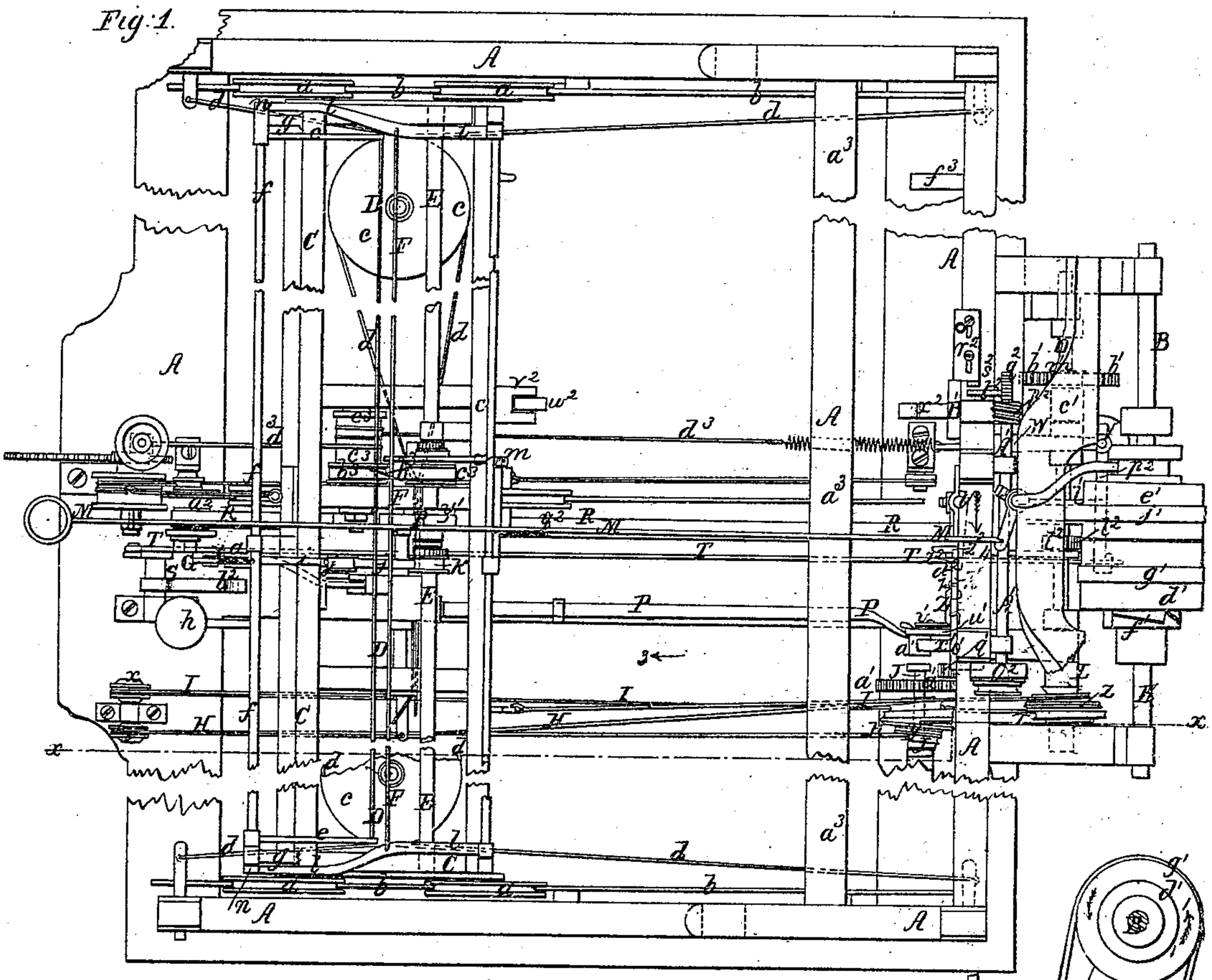
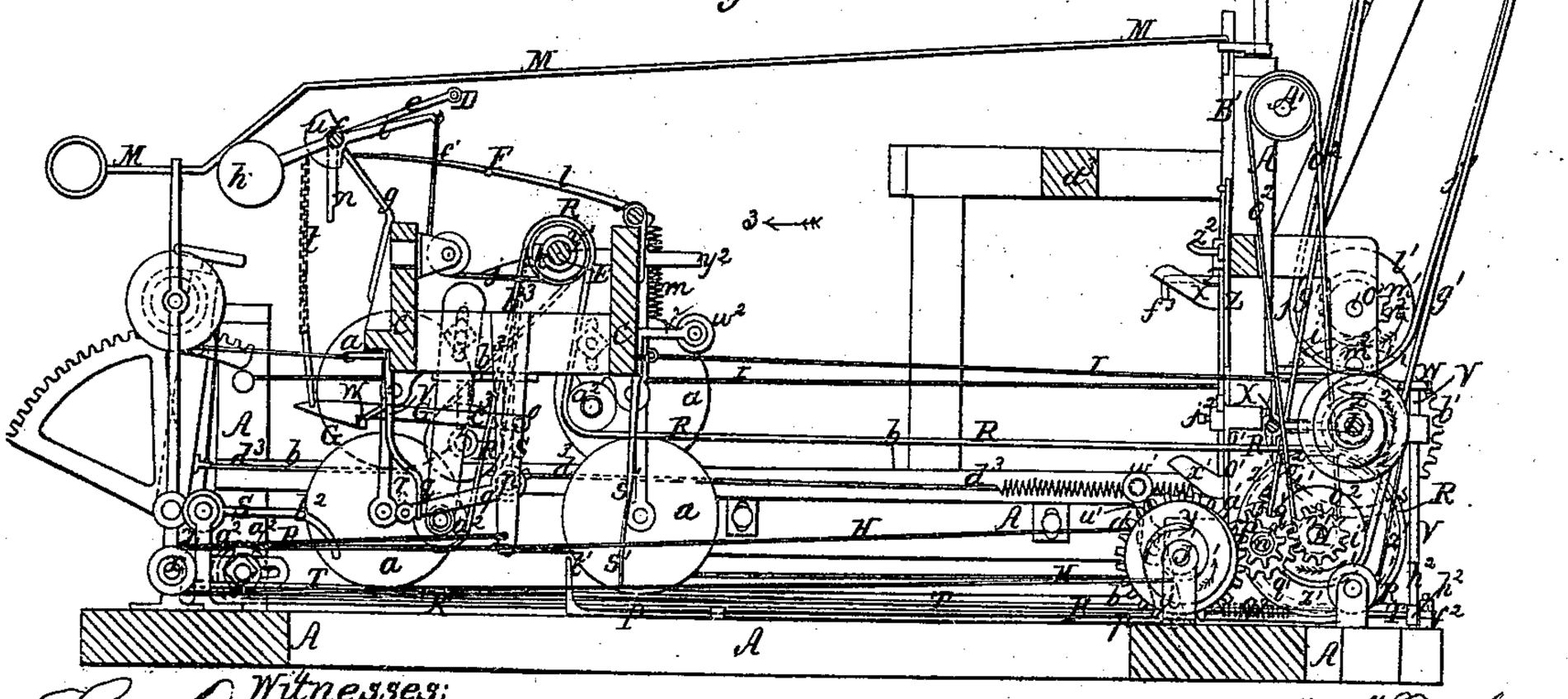


Fig: 2.



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Sheet 2 - 2 Sheets.

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Fig: 3.

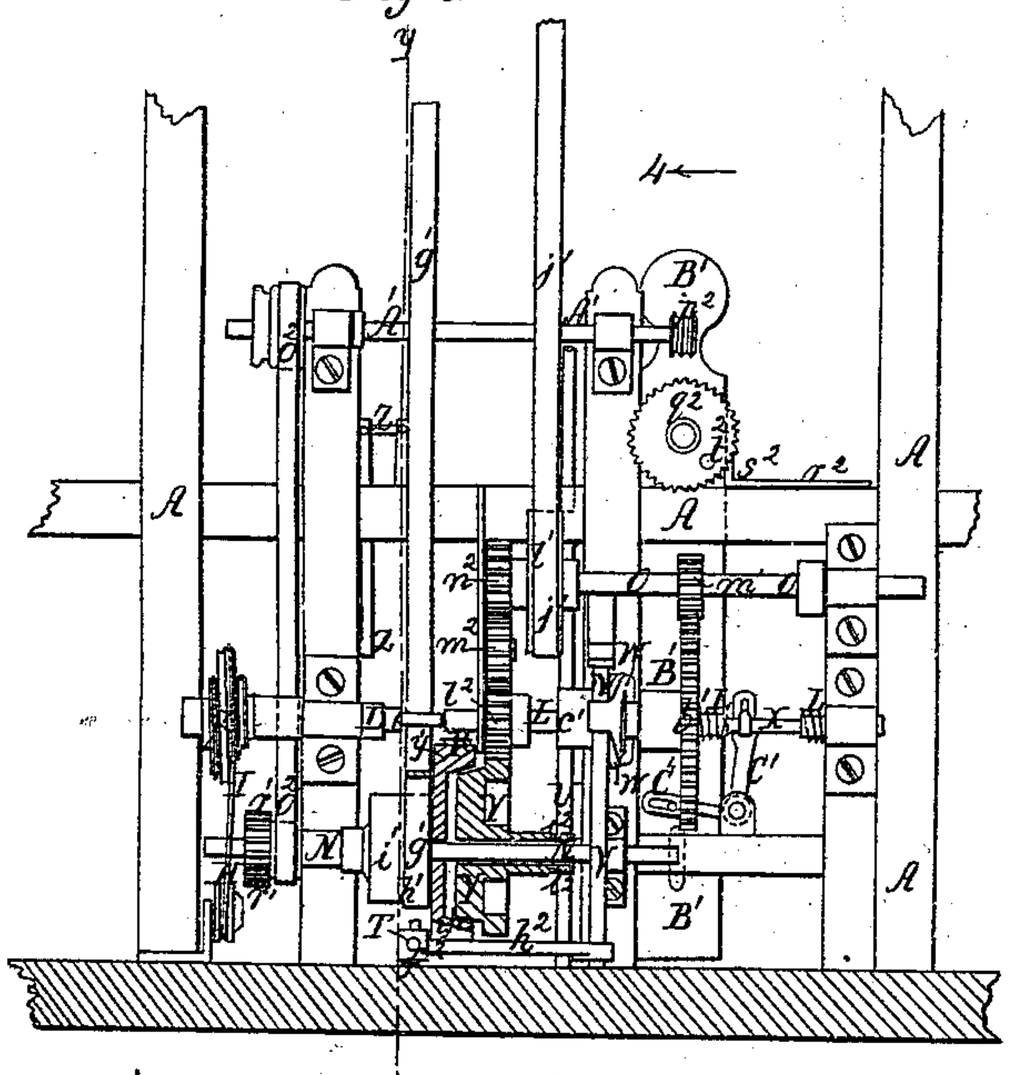


Fig: 4.

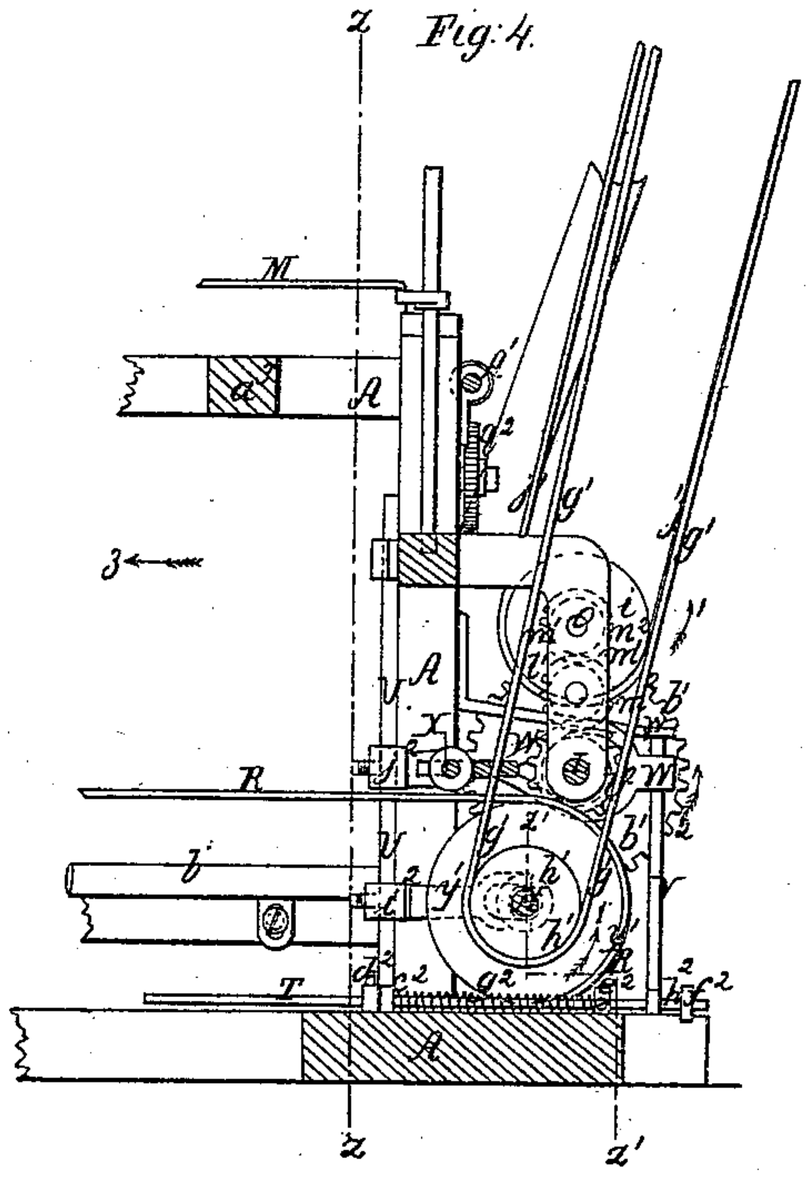
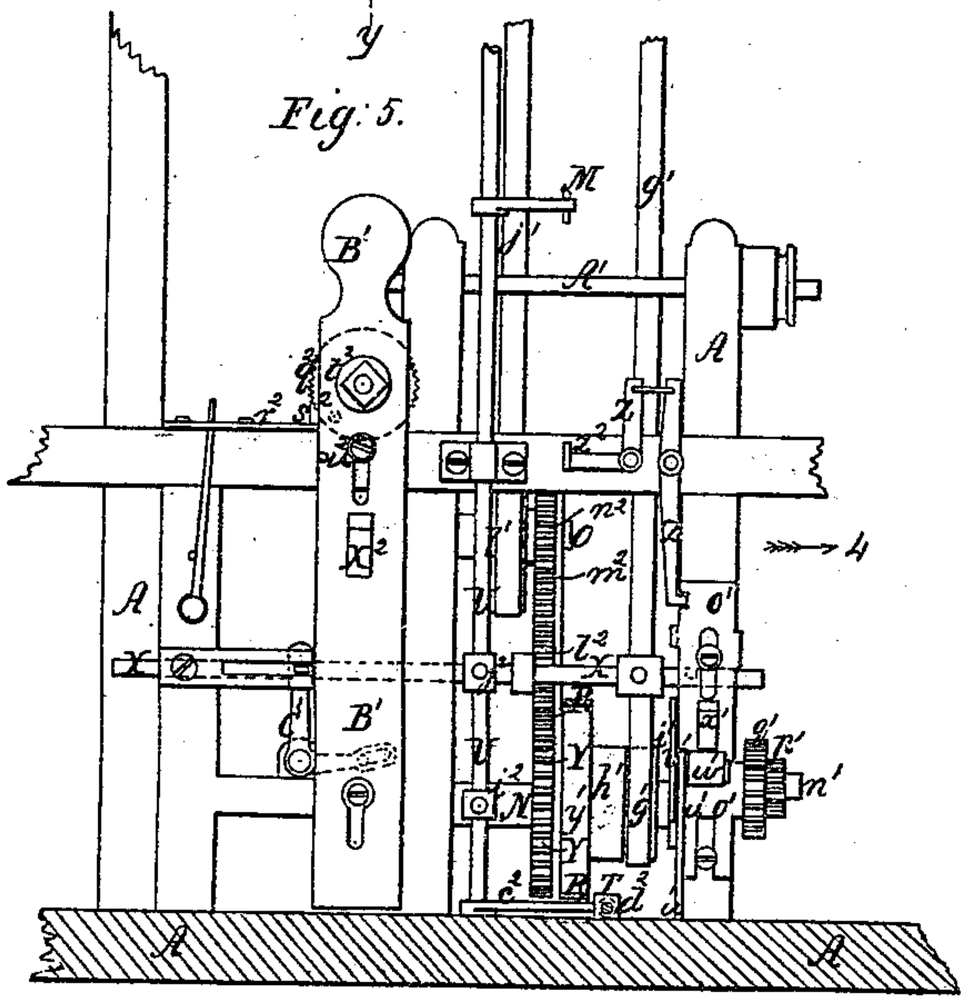


Fig: 5.



Witnesses;

Inventor;

W. H. Brothers
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UNITED STATES PATENT OFFICE.

WILLIAM H. BROTHERS, OF WINOOSKI, VERMONT, ASSIGNOR TO HIMSELF AND ELISHA ALLEN, OF SAME PLACE.

IMPROVEMENT IN JACKS FOR SPINNING.

Specification forming part of Letters Patent No. **94,278**, dated August 31, 1869.

To all whom it may concern:

Be it known that I, WILLIAM H. BROTHERS, of Winooski, in the county of Chittenden and State of Vermont, have invented a new and Improved Spinning-Frame; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Plate I, represents a plan or top view of my improved spinning-frame. Fig. 2, Plate I, is a vertical section of the same, the plane of section being indicated by the line *x x*, Fig. 1. Fig. 3, Plate II, is a rear elevation, partly in section, of the same, the plane of section being indicated by the line *z' z'*, Fig. 4. Fig. 4, Plate II, is a detail vertical section of the same, taken on the plane of the line *y y*, Fig. 3. Fig. 5, Plate II, is a detail vertical section of the same, taken on the plane of the line *z z*, Fig. 4.

Similar letters of reference indicate corresponding parts.

This invention relates to a new spinning-jack, which is so arranged that the mule or carriage will receive its motion by automatic machinery, without requiring any personal attention of the operator or attendant.

The object of the invention is to do away with the necessity of working the shipper-bar for reversing the motion of the mule, and to provide automatic means for changing the motion.

The invention consists in the construction of devices for changing and reversing the motion of the mule, for imparting to the thread the necessary drawing-and-twisting motion and the requisite tension while twisting, and for operating the whole mechanism, all as hereinafter more fully described.

A in the drawing represents the stationary frame of my improved spinning-machine, carrying near one end the driving-shaft B, to which, by a suitable belt or other mechanism, the requisite rotary motion is imparted.

C is the mule or carriage, traveling, by means of wheels *a a*, on rails or tracks *b*, that are secured to or formed on the frame A. The mule itself is of suitable construction, and adapted to hold the spindles in suitable manner. The bands *d d* are secured to diagonal points of the frame, and pass over rollers *c* of the carriage to keep the carriage square. On the frame of the carriage is pivoted, near the front side, the faller-wire D, which is, by arms *e e*, attached to a bar, *f*, pivoted to lugs *g*, that project from the carriage. A weight, *h*, is secured to the forward side of the bar *f*, for the purpose of holding the faller up when the same is not otherwise drawn down. An arm, *i*, projecting backward from the bar *f*, is, by a strap, *j*, connected with a loose pulley, *k*, that is arranged on a horizontal shaft, E, hung transversely in the carriage, as shown. The stripper-wire F is secured to arms *l l*, that are pivoted to the forward side of the carriage, and is, by a spring, *m*, held up. The arms *l* project forward beyond the wire F, to catch against arms *n* projecting from the faller, as hereinafter more fully described. In pendants *o o*, projecting from the under side of the carriage, is an arbor, *p*, from which projects forward a finger, *q*, which has a small friction-roller, *r*, at its front end. To another arm, *s*, projecting upward from the arbor *p*, is pivoted the rear end of a hook, G, which is, by a small strap or chain, *t*, connected with a segment, *u*, that is mounted on the bar *f*, as shown in Fig. 2. The finger *q* is supported on an arm, *v*, projecting from the carriage, and the hook G is, by another higher arm, *w*, prevented from falling lower than said arm.

The carriage C is, by means of two belts or scroll-bands, H and I, connected with the driving mechanism. Both ends of each of these belts are fastened to the carriage, and both are fitted around rollers *x*, in front of the frame A, and over the driving scroll-rollers in rear of the same. The scroll-band H passes over the scroll-pulley *y*, and serves to move the carriage forward, while the band I passes over the scroll-pulley *z*, and serves to draw the carriage backward, as hereinafter set forth. Each band H and I, if connected with scroll-pulleys, consists of two pieces, one end of each piece being fastened to the scroll-pulley and the other to the mule. If each of these bands is, however, made of one piece, it will merely pass over the roller *y* or *z*, which will in that case be a plain pulley.

The pulley y is mounted on a shaft, J, which carries a toothed wheel, a^1, to receive its motion from the main driving mechanism. The pulley z is mounted on a horizontal shaft, L, which carries and is driven by a loose toothed wheel, b^1, that is thrown in gear with the clutch c^1, when the shaft is set in motion.

The main driving-shaft B has its bearings in the back part of the frame A, behind the creel-frame, and receives rotary motion by suitable mechanism. It carries loose pulleys d^1 and e^1, which can, by a hand-shipper, M, be thrown against a clutch, f^1, that is mounted on the shaft B. When the pulleys d^1 e^1 are thus in gear, they will impart motion to the other parts of the machine; otherwise the machine will be entirely out of gear.

The belt g^1 of the pulley d^1 passes over one of two pulleys, h^1 and i^1, that are arranged on a horizontal shaft, N, which is hung in the lower part of the frame A, the pulley h^1, being fixed on said shaft, while the pulley i^1 is loose thereon. The belt j^1 of the pulley e^1 is fitted over a pulley, l^1, which is mounted on a horizontal shaft, O, hung in the frame A. A pinion, m^1, on the shaft O is in constant gear with the loose toothed wheel b^1, and revolves the same, so as to impart rotary motion to it and its shaft L when the same is locked to the clutch c^1. The shaft B being turned in the direction of the arrow 1, revolves the shaft O in the same direction, and the shaft L and scroll z in the direction of the arrow 2, so that the carriage will be drawn back when the said scroll is thus revolved. The shaft N is revolved when the belt g^1 is on the tight pulley h^1, also revolved in the direction of the arrow 1, and imparts motion in the same direction to the shaft J and scroll y by intermediate gearing, as hereinafter more fully described, so that by such motion of the scroll y the carriage will be moved forward. n^1 is a short arbor, having its bearings in a sliding plate, o^1, which is arranged in front of the upright frame-work, carrying the various shafts B J L N O aforesaid, said plate o^1 being fully shown in Fig. 5. The arbor n^1 carries pinions p^1 q^1, which will gear, respectively, into the toothed wheels a^1 and r^1, the latter being mounted on the shaft N, as in Figs. 2 and 3. When the plate o^1 is lowered, as in Fig. 2, it will establish a connection between the wheels a^1 and r^1, and will therefore serve to transmit motion from the shaft N to the scroll y whenever the belt g^1 is on the fixed pulley h^1. The carriage is, when the scroll y is thus revolved, drawn forward in the direction of the arrow 3, and this motion is stopped whenever a stop, s^1, projecting from the under side of the carriage, strikes a lug, t^1, that projects from a slide-bar, P, shown in Fig. 2. This slide-bar P is, at its rear end, pivoted to the lower end of a short plate, u^1, which is pivoted to a stationary arm, v^1, of the frame. The plate u^1 carries, at its upper end, a small friction-roller, w^1, which fits under a lug, x^1, that projects from the slide-plate o^1. When the stops s^1 strike the lug t^1, during the forward motion of the carriage, the bar P is pulled forward, and swings the plate u^1, so as to bring it into a vertical position, thereby the roller w^1 is brought under the lug x, and elevates the same, and with it the plate o^1, and when the plate o^1 is thus elevated its pinions p^1 q^1 are raised out of gear, and the motion of the scroll y is stopped. The forward movement of the carriage is accordingly arrested, but its backward motion is not yet established, as the carriage has to remain stationary to allow the requisite twisting of the yarn, which is carried on by means of an endless belt, R, passing over a fixed pulley, y^1, of the shaft N over a pulley, z^1, on the shaft E of the carriage, and over friction-rollers a^2 on the carriage and frame A, as is clearly shown in Fig. 2. When the carriage is at the end of its forward motion its roller r strikes against an arm, b^2, of a bell-crank, S, that is pivoted to the front part of the frame A, the lower arm of said bell-crank being secured to a rod, T, that reaches to the back of the frame. The rear end of the rod T fits through an arm, c^2, that projects from a vertical rock-shaft U. On the rod T are formed three shoulders, d^2, e^2, and f^2, the shoulder d^2 being in front of the arm c^2, while the others are in rear of the same, as in Fig. 4. A spring, g^2, is interposed between c^2 and e^2, tending to swing the arm c^2 forward. That portion of the rod T which is between the shoulders e^2 and f^2 fits through an arm, h^2, which projects from a vertical rock-shaft, V. This vertical rock-shaft V carries, or rather is connected with, the clutch-lever W, by which the loose wheel b^1 is thrown in or out of gear.

On the vertical rock-shaft U are two other projecting-arms, i^2 and j^2, of which the upper one, j^2, straddles a horizontal sliding bar, X, while the lower one, i^2, is connected with a loose toothed wheel, Y, that is arranged on the shaft N, so that it can slide on the same. Whenever the roller r of the carriage strikes the arm b^2 of the bell-crank S, it draws the rod T forward, and causes thereby, and by means of the spring g^2, the vertical shaft U to be swung, so as to carry the slide X and the wheel Y toward the scroll z. The slide-bar X has a slot through which the belt g^1 is fitted. Whenever, by the aforesaid action of the rod T, the slide-bar X is moved in the direction of the arrow 4, it will carry the belt g^1 from the tight to the loose pulley i^1, and will thereby cause the motion of the shaft N from the belt g^1 to cease. At the same time, however, the wheel Y, which has a conical projection at one side, is carried against a hollow cone, y^1, that is mounted on the shaft N, and as the wheel Y forms thus a friction-clutch, it is by such motion intimately connected with with the shaft N. By the same motion the wheel Y is thrown into gear with a loose pinion, l^2, of the shaft L, which is, by an intermediate pinion, m^2, connected with a pinion, n^2, that is mounted upon the shaft O. The wheel

Y is thus thrown into gear with the shaft O, which is constantly revolved by the belt j^1, and imparts the regular motion in the direction of the arrow 2 to the shaft N, the said motion being only much slower than it was, as imparted by the belt g^1. The hollow friction-wheel y^1 drives the belt R, and provides, therefore, for the motiou of the belt R and shaft E. During all this time that the carriage moves forward and is stationary, the wheel b^1 is held out of gear by the clutch-lever W, which is connected with the shaft V and with the slide X.

When the slide-plate o^1 was elevated, as aforesaid, it was automatically locked in the elevated position to insure the stationary position of the scroll y by a swinging hook, Z, which is pivoted to the frame A, and which engages into a notch of said plate o^1.

To recapitulate the foregoing, I will state that the shaft N, when driven by the belt g^1, causes the carriage to move forward, and the belt R to be turned, but that as soon as the carriage reaches the end of its forward motion the motion of the shaft N was taken from the shaft O, so as to become slower, and the carriage itself was stopped to give time for the twisting process to be carried on. The belt g^1 was shipped upon the loose pulley, but still the shaft N continued to revolve by being connected by the clutch X y^1 and intermediate gearing with the shaft O. The shaft O itself was not in the gear with the shaft L during the forward motion and rest of the carriage.

By means of a belt, o^2, the shaft N is in constant connection with a horizontal shaft, A′, which is thus revolved as long as the said shaft N is turned by belt or gearing, as aforesaid.

The shaft A′ carries a worm-wheel, p^2, which will at certain times mesh into the teeth of a wheel that may be hung on an arbor projecting from a vertically-sliding shipper-plate, B′. When this shipper-plate is elevated it will be locked by a sliding spring-catch, r^2, which fits into a notch, u^2, of the plate B′, and which has a projecting arm, s^2, as shown. On the wheel g^2 is secured a projecting finger, t^2, which, once during every revolution of the wheel q^2, strikes the arm s^2 and pushes the catch r^2 out of the notch u^2 in the plate B′, so as to allow said plate to drop. By means of a bell-crank, C′, the slide-bar B′ is connected with the sliding shipper-bar X in such manner that the said bar X will be moved in the direction of the arrow 4 when the plate B′ is lowered, while it will be moved in the opposite direction when the plate B′ is elevated.

While the carriage C moves forward, and while it is stationary, as aforesaid, the plate B′ is held elevated by the catch r^2, and the shaft A′ is, therefore, in gear with the wheel q^2. As soon as the finger t^2 of the wheel q^2 strikes the arm s^2 of the catch it will release the plate B′, and the same will fall by its own weight, causing thereby the bar H to be moved in the direction of the arrow 4. By this further motion of the bar X the clutch-lever W will be moved so as to carry the pinion b^1 into gear with the clutch c^1 and pinion m^1 of the shaft O. The scroll h will thus be thrown into gear to cause the carriage C to move back. When the carriage C releases its pressure on the arm b^2 the spring g^2 will draw the rod T back, so as again to throw the toothed clutch-wheel Y out of gear. As the carriage arrives at the end of its backward motion a lug, V^2, on it, carrying a friction-roller, w^2, will fit under an inclined arm, x^2, that projects from the plate B′, and will thereby elevate said plate B′, thereby causing the bar X to be moved back, to throw the wheel b^1 out of gear and the belt g^1 upon the fixed pulley h^1. At the same time another lug, y^2, from the carriage, fits under an arm, z^2, that projects from the hook Z, and throws said hook out of the plate o^1, allowing the latter to drop. Thus, by the disconnection of the wheel b^1, the scroll z is thrown out of gear to stop the further backward motion of the carriage, while at the same time, by throwing the belt g^1 upon the fixed pulley and by dropping the plate o^1, the scroll y is thrown into gear, so as to at once start the carriage forward in the direction of the arrow 3. As the plate B′ is elevated its wheel q^2 is thrown into gear with the worm p^2, and the twisting regulator is thus again established, for, when the wheel q^2 has made one revolution, it will cause the plate B′ to drop and the carriage to start backward, as aforesaid.

The carriage is thus automatically moved, and its motion regulated at will by the proportionate dimensions of the wheels p^2 q^2, and the twist also regulated, as aforesaid.

When the carriage begins to wind up, the faller D should be lowered, which is done by the winding of the strap j upon the loose pulley K. The weight h, by the unwinding of the strap j, gradually draws the faller up during the backward motion of the carriage. When the carriage reaches the end of its backward motion the arms l of the counter-faller wire fit under a cross-bar, a^3, of the frame, and the stripper-wire is thus depressed, and the projecting ends of the arms l are locked in this depressed position by having the ends of the arms l catch under shoulders, formed at the lower ends of the arms n, that are suspended from the rod f. As long, therefore, as the counter-faller wire is thus held depressed to be out of the way, the faller is, for the same reason, held up until drawn down by the strap j.

The shaft E is connected by a crossed band, b^3, with a pulley, c^3, that is rolled by a band, d^3, during the motions of the carriage, the pulley e^3 on the shaft E for receiving the belt b^3 being loose, and connected by a ratchet and pawl, so as to effect the motion of E only in one direction.

f^3 are stops arranged on the back of the frame to arrest the backward motion of the

carriage, so that it cannot come against the driving machinery.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The slide-plate o^1, carrying the intermediate gearing for the forward-moving scroll y, as set forth, when combined with the slide P, as described, so that it will be elevated out of gear when the forward motion of the carriage is completed.

2. The slide-bar P, operated by a lug, s^1, of the carriage, to throw the forward-moving scroll out of gear, as set forth.

3. The hook Z for holding the slide-plate o^1 elevated, when arranged so that it will automatically drop into a notch of the slide-plate when the same is elevated, while it will be thrown out of the notch by a stop on the carriage to lower the plate o^1, substantially as herein shown and described.

4. The slide-bar T, connected with the bell-crank S, so as to be operated by the arm q and roller r of the carriage, substantially as herein shown and described.

5. The slide-bar T, when provided with the shoulders d^2, e^2, and f^2, and with the spring g^2, as described, so as to actuate the rocking shippers U and V, substantially as herein shown and described.

6. The shipper-lever W, when connected both with the rock-shaft V and with the slide-bar X, to operate the loose wheel b^1, substantially as herein shown and described.

7. The slide-plate B′, when connected by a bell-crank, C′, with the sliding shipper-bar X, so as to operate the belt g^1, the loose wheel b^1, and the toothed clutch-wheel Y by its motion. substantially as herein shown and described.

8. The hollow cone y^1, arranged on the shaft N, in combination with the loose toothed clutch-wheel Y and intermediate gearing, substantially as described, to operate the shaft N from the shaft O, for the purpose of imparting a slower motion to the carriage.

9. The rock-shaft U, carrying the arms c^2, i^2, and j^2, substantially as described, so as to receive motion from the slide-bar T, and to impart it to the wheel V and bar X, substantially as herein shown and described.

10. The faller D, when counterbalanced by the weight h, and connected by the strap j with the loose pulley K on the shaft E, to regulate the building of the cop, substantially as herein shown and described.

11. The carriage C, when provided with the stops or projections q, r, s^1, y^2, and v^2 w^2, substantially as described, so that it will automatically set the various parts of the driving-machinery to regulate its own motion, as specified.

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