No. 788,162. PATENTED APR. 25, 1905.

A. L. MATHEWSON.

SPINNING MECHANISM.

APPLICATION FILED APR. 23, 1904.

MODEL.

2 SHEETS—SHEET 1.

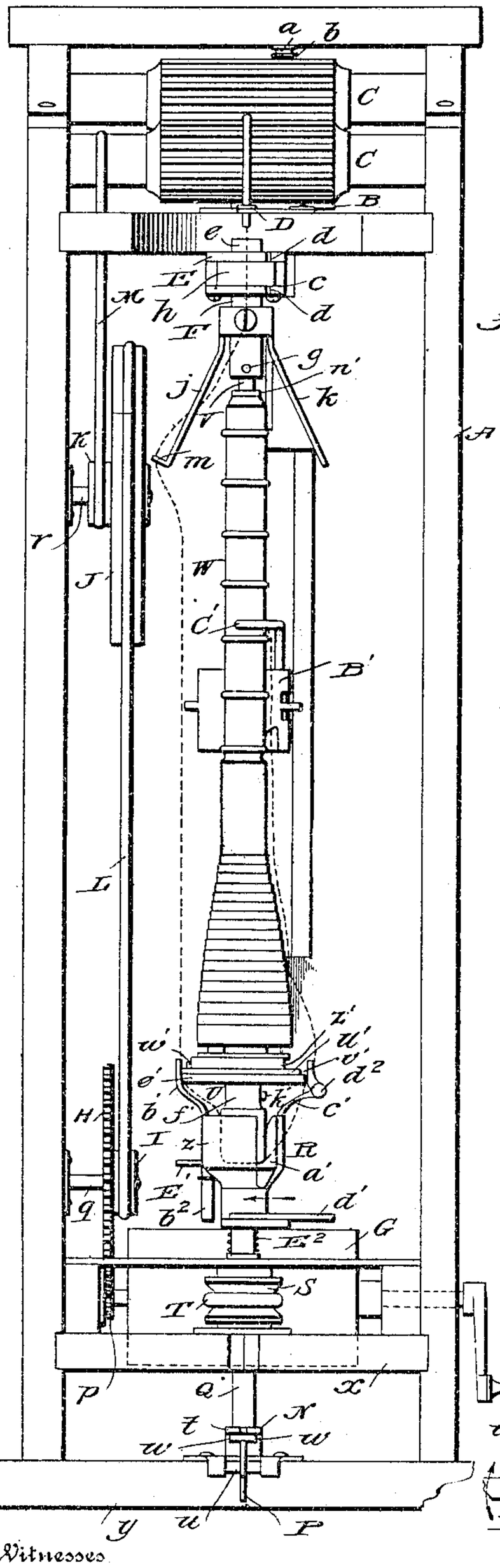

Fig. 1.

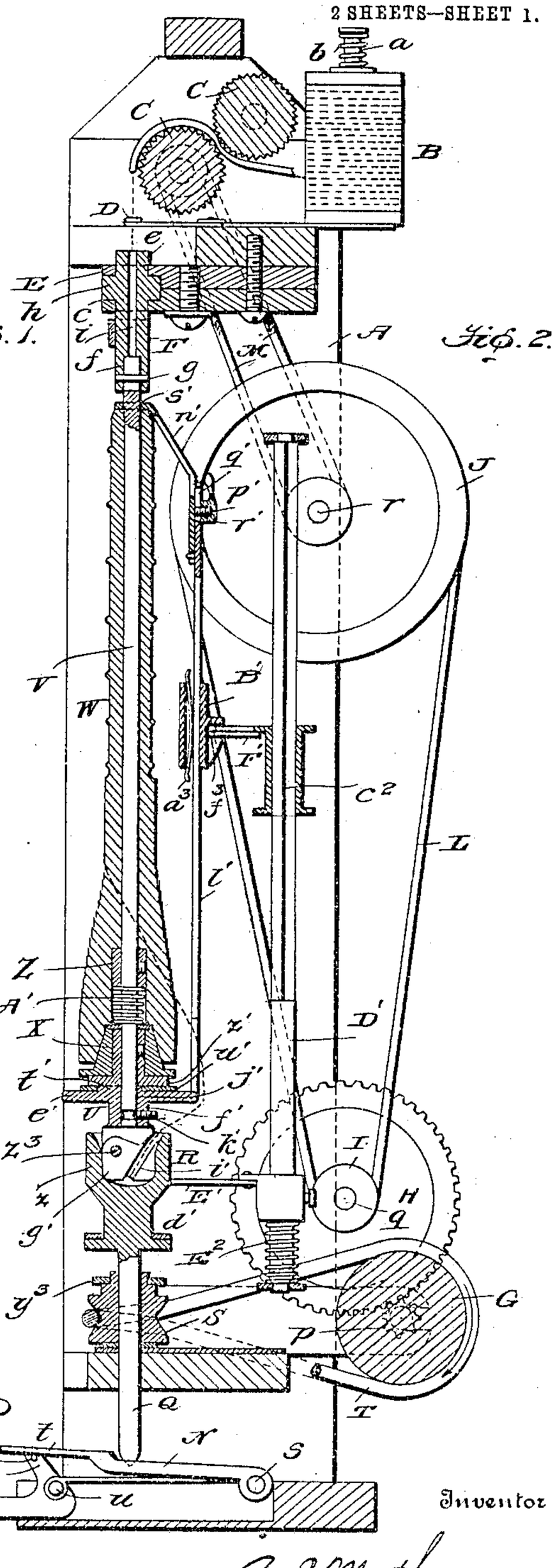

Fig. 2.

Witnesses

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MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

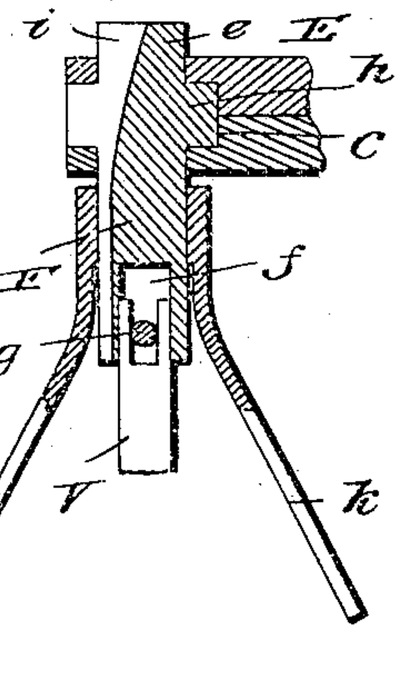


Fig. 4a.

Fig. 3.

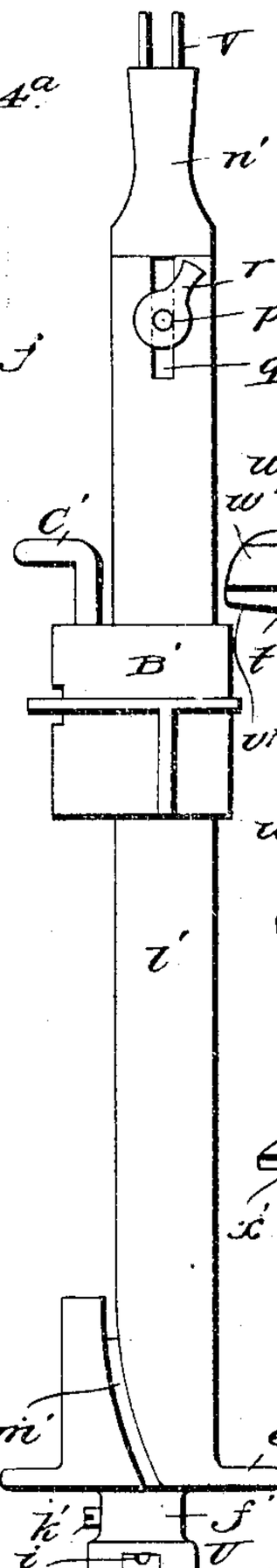


Fig. 5.

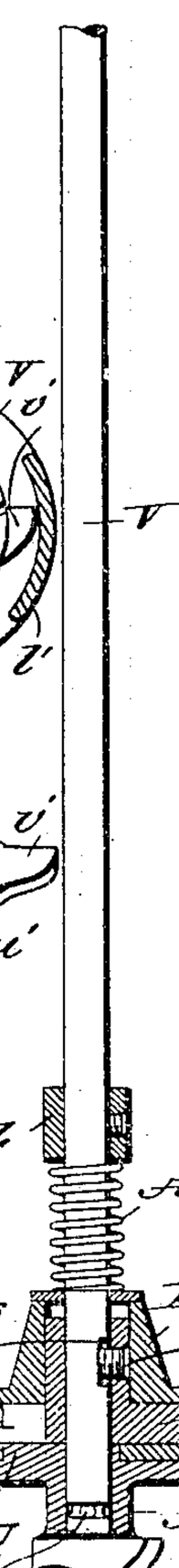


Fig. 6.

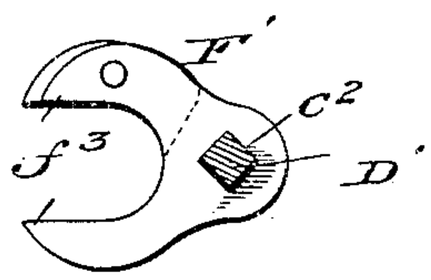


Fig. 8.

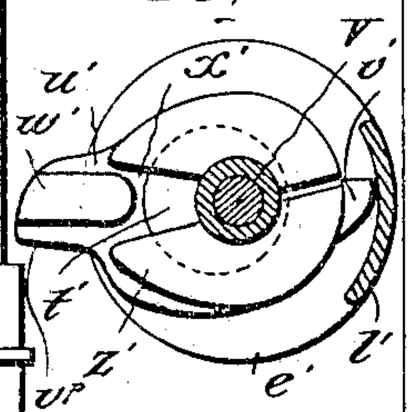


Fig. 9.

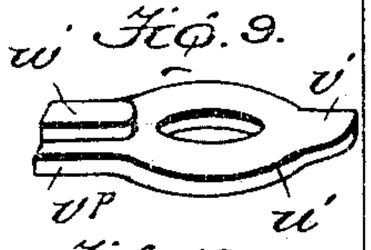


Fig. 10.

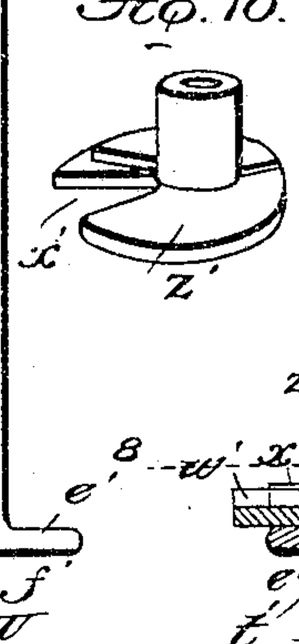


Fig. 7.

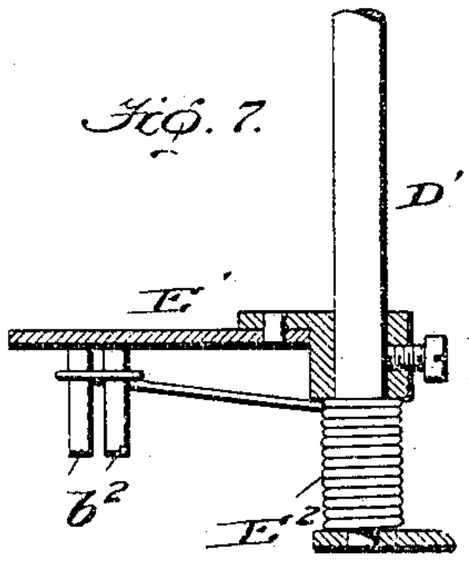
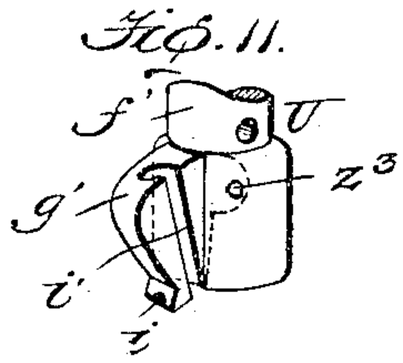
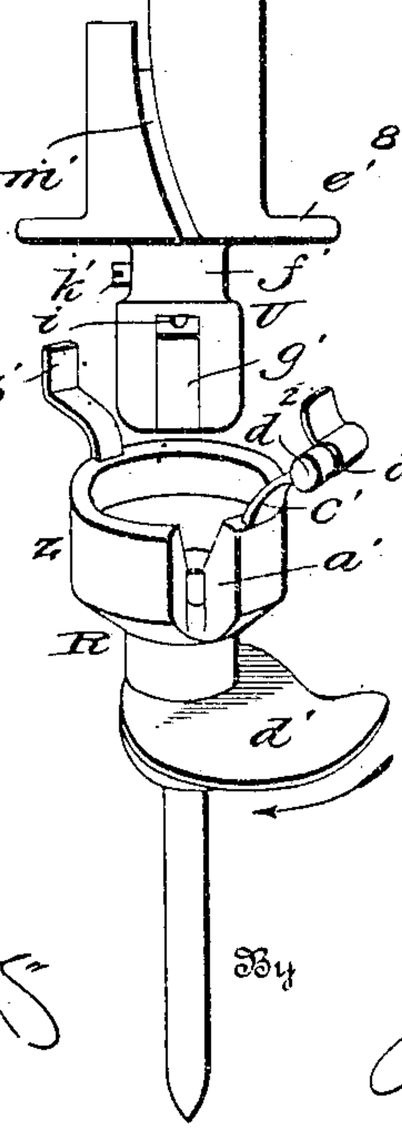
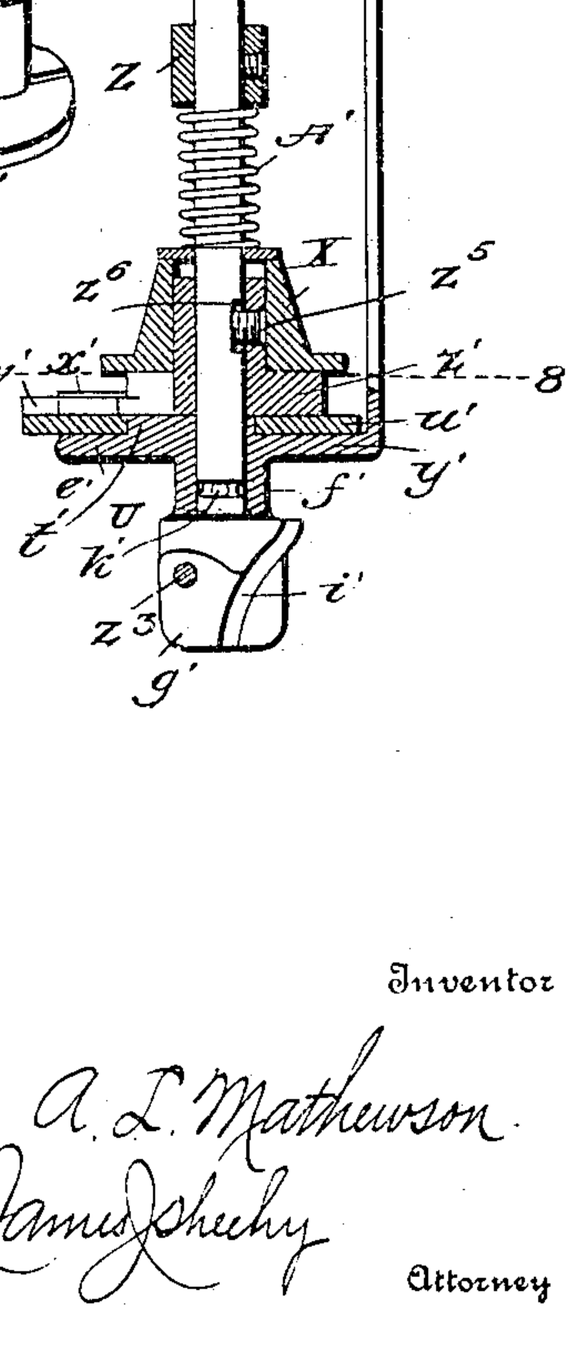


Fig. 11.







Witnesses

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By James J. Healy

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No. 788,162. Patented April 25, 1905.

UNITED STATES PATENT OFFICE.

ARTHUR L. MATHEWSON, OF NORWICH, CONNECTICUT.

SPINNING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 788,162, dated April 25, 1905.

Application filed April 23, 1904. Serial No. 204,598. (Model.)

To all whom it may concern:

Be it known that I, ARTHUR L. MATHEWSON, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented new and useful Improvements in Spinning Mechanism, of which the following is a specification.

My invention pertains to spinning mechanism designed to take the place of spindles in spinning-machines; and it contemplates the provision of a spinning mechanism adapted to run as light and at as high speed as any spindle extant and one which makes two twists to one revolution, whereby its capacity is increased and power saved, and in which the bobbin rotates only fast enough to take up the material as delivered by the roll and rotates slower as it loads with material, so as to lessen the atmospheric pressure against it, and hence the power necessary to drive it.

Other advantageous features of the invention will be fully understood from the following description and claims, when taken in connection with the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of the spinning mechanism constituting the present and preferred embodiment of my invention. Fig. 2 is a vertical central section of the same, taken at right angles to Fig. 1. Fig. 3 is a view illustrating the spindle and its appurtenances as removed from the frame and with some of the appurtenances separated. Fig. 4 is a detail sectional view illustrating the top support for the spindle. Fig. 4ª is a view taken at right angles to Fig. 4 and illustrating one of the depending arms of the said support. Fig. 5 is a detail sectional view of the spindle and its appurtenances. Fig. 6 is a detail plan view of the device designed to be connected with the bobbin-builder of a spinning-frame and to move up and down to build the bobbin. Fig. 7 is a detail view of the lower portion of the upright shaft which carries said device and the spring for rocking the shaft in one direction. Fig. 8 is a cross-sectional plan view taken in the plane indicated by the line 8 8 of Fig. 5. Fig. 9 is a view of the movable plate w' removed. Fig. 10 is a view of the plate x' removed. Fig. 11 is a broken perspective view of the idler, showing the swinging piece, which is carried by said idler, as extending therefrom.

Similar letters designate corresponding parts in all of the views of the drawings, referring to which—

A is a frame which may be of any construction compatible with the purposes of my invention.

B is a material-holding spool loosely mounted on a fixed spindle a at the top of the frame and subjected to the pressure of a spring b, so as to prevent it from turning too freely.

C C are rolls journaled in the upper part of the frame and arranged to receive between them the material from spool B.

D is a material-guide, preferably an eye, which is arranged below the front roll C.

E is an arm connected to the upper portion of the frame A and having a bifurcation c in its forward end and also having alined notches d in the upper and lower walls of said bifurcation, and F is the top support for the spindle hereinafter described. The said top support comprises a stem e, journaled in the bifurcated portion of the arm E and having a socket f in its lower end and a pin g extending diametrically across said socket, and also having a disk h, interposed between the walls of the bifurcation c, and a groove i, adapted to be registered with the notches d for a purpose presently described, and diverging arms j k, connected to the stem e below the arm E. The diverging arm j differs from the arm k in that it is provided in one of its side edges with a notch l and has at its lower end an outturned portion m, notched, as indicated by n.

G, Figs. 1 and 2, is a drum journaled in the lower portion of the frame A and having upon one of its trunnions a pinion p. H is a gear mounted on a short shaft q, connected to the frame A and intermeshed with the pinion p; I, a pulley fixed on the gear H; J K, pulleys fixed together and loosely mounted on a shaft r, connected to the frame A; L, a belt connecting the pulleys I and J, and M a belt connecting the pulley K and the front roll C. In virtue of this construction it will be observed that when the drum G is rotated in the direction indicated by arrow in Fig. 2 by any suit-

able means the front roll C will be rotated in the opposite direction, so as to take material from the spool B after the manner shown in Fig. 2.

N, Figs. 1 and 2, is a vertically-movable lever fulcrumed at *s* in the lower portion of the frame A and having a free longitudinally-slotted portion *t*.

P is a finger-lever fulcrumed at *u* in the base of the frame A and having an upwardly-directed toe *v* movable in the slot of the lever N and provided below said lever with lateral lugs *w;* Q, a vertical shaft journaled in horizontal portions *x y*³ of the frame A and provided at its upper end with a material-carrier R; S, a whirl feathered on the shaft Q and disposed above the frame portion *x*, and T a crossed belt connecting the said whirl and the drum G. Through the medium of the crossed belt T and the whirl S the material-carrier R is rotated in the direction indicated by arrow in Fig. 1 to carry the thread around the lower end of the idler presently described, and yet said carrier may be adjusted vertically to permit of the idler, the spindle, and the parts thereon being readily removed from the apparatus. The material-carrier is normally held in the position shown in Fig. 2 through the medium of the lever N, in which the lower end of the shaft Q is stepped, and the finger-lever P, and when it is desired to lower the said carrier it is simply necessary to throw the finger-lever P in the direction indicated by the arrow at the left of Fig. 2. As best shown in Fig. 3 of the drawings, the said material-carrier R comprises a cup-shaped body *z*, having a notch *a'* in its side, arms *b' c'* reaching outwardly and upwardly from the upper edge of the body *z*, and a horizontally-disposed cam *d'* fixed with respect to the lower portion of the body *z*. The outwardly and upwardly reaching arm *c'* differs from the arm *b'* in that it has a lateral projection *d*² of circular form in cross-section provided in its outer side with a groove *d*³.

U, Figs. 1 to 3 and 5, is an idler, which constitutes an important feature of my mechanism, as will presently appear. The said idler comprises a horizontally-disposed disk-like body *e'* and a central reduced portion *f'*, of circular form in cross-section, depending from the body *e'* and designed to loosely rest in the cup-shaped body *z* of the material-carrier R after the manner illustrated in Figs. 1 and 2. Said depending portion *f'* has a bifurcation in its lower end, in which is pivoted on a pin *z*³ a swinging piece *g'*, having a material-guiding groove *i''*, while in the upper portion of the idler is a socket *j''*, designed to receive the spindle presently described, which has a circumferential groove in its lower portion, Fig. 5, to receive a screw *k'*, by which it is held against upward movement out of the socket and yet is permitted to turn freely in the idler and with respect thereto. While the depending portion *f'* of the idler U and the piece *g'* in said portion *f'* rest in the cup-shaped body *z* of the material-carrier R the said idler U, as its name implies, does not revolve.

Reaching upwardly from the perimeter of the circular or disk-like body *f'* of the idler U is a bar *l'*, which is provided in the outer side of its lower portion with a material-guiding groove *m'*, Fig. 3. On the upper end of the said bar *l'* an arm *n'* is removably secured through the medium of a threaded bolt *p'* on the arm, which bolt extends through a notch *q'* in the upper end of the bar, and a nut *r'*, mounted on the bolt and arranged to bear against the outer side of the bar *l'*. The arm *n'* has a vertically-disposed aperture *s'*, designed to receive the spindle, presently described, at a point above the bobbin, and when the idler, the spindle and bobbin thereon, and the bar *l'* and its appurtenances are removed from the apparatus the said arm *n'* may be readily disconnected from the bar *l'*, so as to permit of the quick and easy removal of the bobbin from the spindle. When desirable, the arm *n'* may have a vertical notch in its lower end to receive a stud on the inner side of the bar *l'*, Fig. 2, this to hold the said arm *n'* against swinging laterally on the bar *l'*.

V, Figs. 2 and 5, is the spindle comprised in my novel mechanism. The upper end of the said spindle is let into the socket *f* of the top support F and is provided with a notch which receives the diametrical pin *g* of the top support, whereby it will be seen that when the spindle is rotated the top support will be caused to rotate with it. As before stated, the lower end of the spindle is arranged to rotate in the socket *j''* of the idler U, and immediately above the disk-like body *e'* of the said idler and integral therewith is an eccentric *t'*. (Best shown in Fig. 5.) This eccentric *t'* is disposed in a circular aperture in a horizontally-movable plate *u'*, provided with a projection *v'*, and is designed to move the said plate so that the projection *v'* thereof alternately rests within the outline of the idler-body *e'* and projects beyond the said outline—this in order to enable the projection to clear the material, as presently more fully described. The plate *u'* is further provided with a projection *v'*, carrying an upwardly-extending lug *w'*, which rests in a notch *x'* of a plate *z'* on the spindle, and has for its purpose to transmit rotary motion from the said plate *u'* to the spindle. The plate *z'* is preferably fixed on the spindle through the medium of a set-screw *z*⁵, which preferably takes into a recess *z*⁶ in the spindle, Fig. 5.

W is the bobbin, which is removably placed on the spindle V below the arm *n';* X, a block loosely mounted on the upwardly-extending portion of the plate *u'* and arranged in the lower enlarged portion of the bobbin; Z, a collar loosely mounted on the spindle and arranged to bear against the bobbin, and A' a

coiled spring surrounding the spindle and interposed between the block X and the collar Z. The said spring serves to press the collar Z against the bobbin and holds the bobbin under yielding pressure against the arm a', with the result that sufficient tension is provided between the spindle and the bobbin to assure the bobbin taking up just the quantity of material which the front wall C delivers.

B′ is a slide movable vertically on the bar l' and held against casual or too free movement on said bar by a spring a^3, Fig. 2, and C′ is a finger carried by the said slide, curved in the direction of its length and designed to serve a purpose set forth in the following description of the operation.

D′ is an upright rock-shaft journaled in suitable bearings in the frame A and having a lateral arm E′ on its lower portion provided with one or more depending lugs b^2 and also having an upper portion c^2 of angular form in cross-section; E², a coiled spring mounted on the lower portion of the rock-shaft D′ and having one of its arms connected to the frame A and its other arm connected to the shaft-arm E′, so as to hold the lug b^2 on said shaft-arm in position to be engaged by the edge of the cam d', and F′ is a piece movable vertically on the angular upper portion of the shaft D′ and arranged to rock with said shaft and having fingers f^3 designed to serve the purpose set forth in the following description of the manner in which the mechanism operates.

The swinging piece g' is provided in the lower portion of the idler U in order to facilitate the threading of the idler, the said swinging piece being extended from the idler when the thread is placed in the groove i'', Fig. 11, and being then returned to its normal position in the idler. (Shown in Figs. 3 and 5.)

In practice my novel mechanism is threaded after the manner shown in Figs. 1 and 2—that is to say, the material is passed first between the two rolls C, then through the eye D, then through the notch i in the disk h of the top support F, then through the notch l and notch n of the support-arm j, then down between the fingers of the device F′, which has for its function to move and build the bobbin, then through the groove i'' in the swinging piece g' of the idler U, then through the notch a'' in the cup-shaped body z of the carrier R, then up and over the projection d^2 of the carrier-arm c', where it rests in the groove d^3, and then up and over the finger C′ and to and around the bobbin. With this done the drum G is rotated in the direction indicated by arrow in Fig. 2, when the material will be delivered by the rolls C and twisted on the bobbin W. The placing of the material in the groove i'' of the swinging piece g' may obviously be readily effected when the said piece is swung so as to carry the groove i'' out of the bifurcation in the reduced depending portion of the idler U, as shown in Fig. 11 and before described. The twisting of the material on the bobbin is accomplished in the following manner, viz: The belt T and the pulley S transmit rotary motion to the carrier R, and the said carrier by reason of its arms b' c' being arranged to engage the projection x' of the eccentric-plate u' and the lug w' on said plate u' resting in the notch x' of the plate z', fixed on the spindle V, serves to rotate the said spindle. As one of the arms b' c' passes out of engagement with the projection x' of plate u' the other arm engages said projection, and from this it follows that the spindle will be kept in perfect motion. The side of the carrier R being notched, as indicated by a', the said carrier operates to push the material before it and carry the same around the lower end of the idler, and thereby makes two twists to one revolution, which contributes materially to the capacity of the mechanism. The end of the plate u' bearing the projection x' is alternately moved outwardly and inwardly through the medium of the eccentric t', fixed on the upper side of the idler U, and hence it will be seen that the said projection x' will clear the material incident to the rotations of the spindle and bobbin thereon. The cam d', which is fixed with respect to the carrier R, as before described, engages one of the lugs b^2 of the arm E′ on shaft D′ in the direction indicated by arrow in Fig. 2 to assist in building the bobbin through the medium of the device F′. The said device F′ is free to move vertically on the upper portion of the shaft D′, and the slide B′ is adapted to be moved vertically on the bar l', carried by the idler U.

It will be appreciated from the foregoing that the idler U does not revolve, and yet holds the material or thread and conveys the same to the bobbin, and at the same time assists materially in the control of the material or thread. It will also be appreciated that the bobbin never makes more than about three hundred turns per minute to about six thousand turns of the spindle, and hence the atmospheric pressure against the bobbin is lessened. This is particularly true when the bobbin is loaded with material, since the speed of the bobbin gradually diminishes as the material is put upon the same, and hence but a minimum amount of power is necessary to drive the bobbin.

The device F′ connects with the bobbin-builder of a spinning-frame and moves up and down to build the bobbin. The said bobbin-builder and the connection between the device F′ and the same form no part of my invention, and I have therefore deemed it unnecessary to illustrate the same. The said device F′ also serves to hold the idler U against rotation and to move with the shaft D′ and act upon the slide B after the manner of a pallet-lever in the scape-wheel of a watch or clock movement. One finger of the device

F′ holds the idler U while the thread passes by, and as soon as thread passes one finger of the device F′ that finger takes its place in the slide B′, while the thread passes the other finger without interruption. The device F′ is also intended to rest under the shelf on the outer side of the slide B′ and move the slide up and down on the bar and hold the idler U against rotation and move out of the way to let the thread pass by. This latter is due to the cam *d*′ and the arm E′. The finger C′ on slide B′ lies flat against the bobbin when the latter is empty and moves outwardly as the bobbin fills up, this to lay the work on the bobbin. The thread is carried up from the groove *m*′ and passes over finger C′ and on the bobbin. From this it follows that the work is carried up and down to build the bobbin, the idler U is held still to make the two twists, and the work is laid on the bobbin.

I have entered into a detailed description of the construction and relative arrangement of the parts embraced in the present and preferred embodiment of my invention in order to impart a definite understanding of the construction, mode of operation, and advantages of the said embodiment. I do not desire, however, to be understood as confining myself to such specific construction and relative arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my invention as claimed.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a spinning mechanism, the combination of a spindle, an idler receiving the spindle and having a passage for the material to be spun, a bobbin mounted on the spindle, and a rotary carrier receiving the idler and arranged to rotate the spindle and carry the material to be spun around.

2. In a spinning mechanism, the combination of a spindle, an idler receiving the spindle and having a passage for the material to be spun, a bobbin mounted on the spindle, a rotary carrier receiving the idler, and arranged to carry the material to be spun around, and coacting means on the spindle and the rotary carrier whereby the former is rotated by the latter.

3. In a spinning mechanism, the combination of a spindle, an idler having means for holding the material to be spun, a rotary carrier arranged to carry the material to be spun around, and a driving connection between the rotary carrier and the spindle for rotating the latter by the former.

4. In a spinning mechanism, the combination of a rotary carrier having a socket in its body, and adapted to carry the material to be spun around, an idler having a reduced portion arranged in the socket of the carrier, and provided with a passage for the material to be spun, and also having a socket, a spindle arranged in the socket of the idler and adapted to receive a bobbin, and a driving connection between the carrier and the spindle for rotating the latter by the former.

5. In a spinning mechanism, the combination of a rotary carrier comprising a cup-shaped body having a notch in its side, an idler having a reduced portion arranged in the cup-shaped body of the carrier and provided with a passage for the material to be spun, and also having a socket, a spindle arranged in the socket of the idler and adapted to receive a bobbin, and a driving connection between the carrier and the spindle for rotating the latter by the former.

6. In a spinning mechanism, the combination of a rotary carrier arranged to carry the material to be spun around, and having a cup-shaped body and opposite arms on the same, an idler arranged in the cup-shaped body of the carrier and having a socket, and also having a passage, a spindle arranged in the socket of the idler, and adapted to receive a body, and a plate connected with the spindle and arranged to be engaged by the arms of the carrier.

7. In a spinning mechanism, the combination of a rotary carrier arranged to carry the material to be spun around, and having a cup-shaped body and opposite arms on the same, an idler arranged in the cup-shaped body of the carrier and having a socket, a passage for material, and an eccentric, a spindle arranged in the socket of the idler, and a plate receiving the eccentric on the idler and connected with the spindle and arranged to be engaged by the arms of the carrier.

8. In a spinning mechanism, the combination of a rotary carrier having a cup-shaped body provided with a notch in its side and opposite arms on said body, an idler arranged in the cup-shaped body of the carrier and having a socket, a passage for material and an eccentric, a spindle arranged in the socket of the idler, and having a plate provided with a notch, and a plate receiving the eccentric on the idler, and having a lug disposed in the notch of the plate on the spindle; said eccentric-plate being arranged to be engaged by the arms of the carrier.

9. In a spinning mechanism, the combination of a rotary carrier having a cup-shaped body arranged to carry the material to be spun around, an idler having a socket, and also having a bifurcated portion disposed in the body of the carrier, and a swinging piece in said bifurcated portion, provided in its side with a groove, a spindle arranged in the socket of the idler, and means intermediate of the carrier and the spindle for rotating the latter by the former.

10. The combination, in a spinning mechanism, of a bifurcated part, and a swinging piece mounted in said bifurcation of the part and having a groove in its side; said groove

being arranged to be closed by one wall of the bifurcation when the swinging piece is in the bifurcation and to be exposed when the swinging piece is swung out of the bifurcation.

11. In a spinning mechanism, the combination of a frame, a spindle adapted to receive a bobbin, a top support for the spindle with which the latter is removably engaged, a vertically-adjustable, rotary carrier arranged to carry the material to be spun around, and having a socket, means for adjusting said rotary carrier, an idler arranged in the socket of the carrier and having a socket receiving the lower end of the spindle, and also having a passage for the material to be spun, a bobbin removably arranged on the spindle, and means intermediate of the rotary carrier and the spindle for rotating the latter by the former.

12. In a spinning mechanism, the combination of a frame, a rotary carrier arranged to carry the material to be spun around, and having a socket, an idler disposed in the socket of the carrier, and having a socket and a passage for the material to be spun, a spindle arranged in the socket of the idler, means intermediate of the rotary carrier and the spindle for rotating the latter by the former, a shaft mounted to rock in the frame alongside of the spindle, means for rocking said shaft in one direction, an arm on the shaft, and a tappet device fixed with respect to the rotary carrier and arranged to engage the arm so as to rock the shaft in the other direction, a device for putting material to be spun on a bobbin; the said device being mounted on the shaft so as to rock therewith and move longitudinally thereon and suitable means for actuating said device.

13. In a spinning mechanism, the combination of a frame, a rotary carrier arranged to carry the material to be spun around, and having a socket, an idler disposed in the socket of the carrier and a passage for the material to be spun, a bar fixed to and extending upwardly from the idler, a slide movable on said bar and having a finger, a spindle arranged in the socket of the idler, a shaft mounted to rock in the frame alongside of the spindle and having a lateral arm, means for rocking said shaft in one direction, a tappet device fixed with respect to the rotary carrier and arranged to engage the arm so as to rock the shaft in the other direction, and a device for putting material to be spun on a bobbin; the said device being mounted on the shaft so as to rock therewith and move longitudinally thereon.

14. In a spinning mechanism, the combination of a frame, material-delivering rolls mounted in the frame, a primary driver, a driving connection between the driver and one of the rolls for rotating the latter by the former, a rotary carrier arranged to carry the material to be spun around, a driving connection between the primary driver and said carrier, an idler having a socket, and a passage for the material to be spun, a spindle arranged in the socket of the idler, and a connection between the carrier and the spindle for driving the latter by the former.

15. In a spinning mechanism, the combination of a frame, a spindle, a top support for the spindle, journaled in the frame, coacting means on the spindle and top support whereby the former is enabled to turn the latter, a vertically-adjustable, rotary carrier arranged to carry the material to be spun around, and having a socket in its upper side, means for adjusting said carrier vertically, an idler disposed in the socket of the carrier and having a socket receiving the lower end of the spindle, and also having a passage for the material to be spun, and means for transmitting motion from the rotary carrier to the spindle.

16. In a spinning mechanism, the combination of a spindle, an idler receiving the spindle and having a passage for the material to be spun, a bobbin mounted on the spindle, a rotary carrier receiving the idler and arranged to rotate the spindle and carry the material to be spun around, a horizontally-rocking device movable vertically at the side of the bobbin and having fingers, means whereby said device is enabled to hold the idler against rotation and suitable means for actuating the said device.

17. In a spinning mechanism, the combination of a spindle, an idler receiving the spindle and having a passage for the material to be spun, a bobbin mounted on the spindle, a rotary carrier receiving the idler and arranged to rotate the spindle and carry the material to be spun around, a horizontally-rocking device movable vertically at the side of the bobbin and having fingers, means whereby said device is enabled to hold the idler against rotation, suitable means for actuating the said device, a slide having a finger and arranged to be moved by the said device.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR L. MATHEWSON.

Witnesses:

GEORGE W. MATHEWSON,

CHAS. F. THAYER.