(No Model.) 4 Sheets—Sheet 1.

J. HIGGINS & T. S. WHITWORTH.

A. HIGGINS, Executor of J. HIGGINS, Dec'd.

SLUBBING AND ROVING FRAME.

No. 341,574. Patented May 11, 1886.

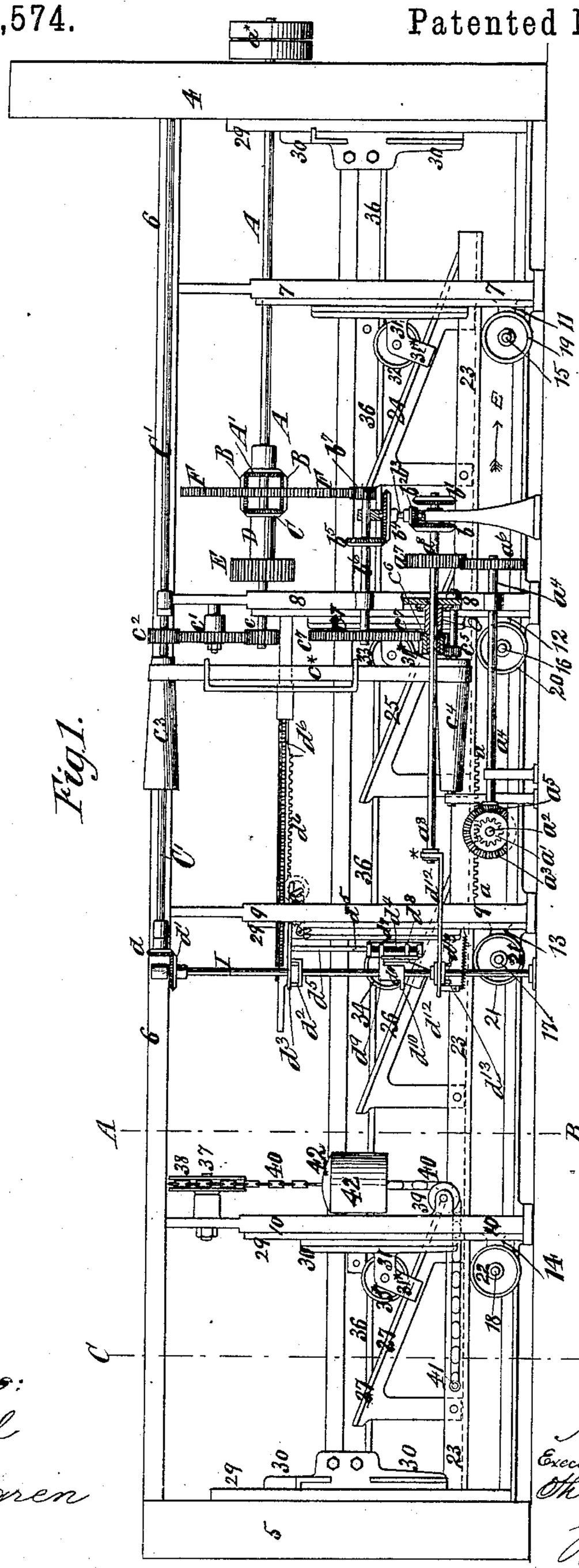

Fig. 1.

Witnesses:
C. Hull
C. L. Sundgren

Inventors:
Alfred Higgins
Executor of James Higgins, Dec'd.
Thos. S. Whitworth
by their Attys
Brown & Brown

(No Model.) 4 Sheets—Sheet 2.

J. HIGGINS & T. S. WHITWORTH.

A. HIGGINS, Executor of J. HIGGINS, Dec'd.

SLUBBING AND ROVING FRAME.

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Fig. 3.

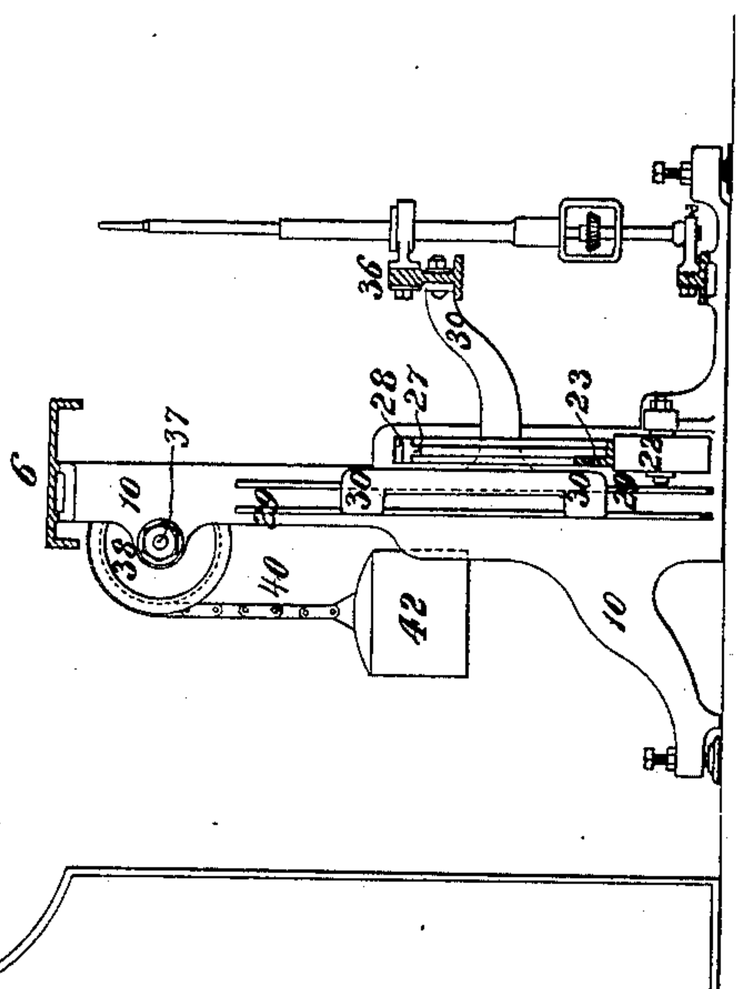


Fig. 5.

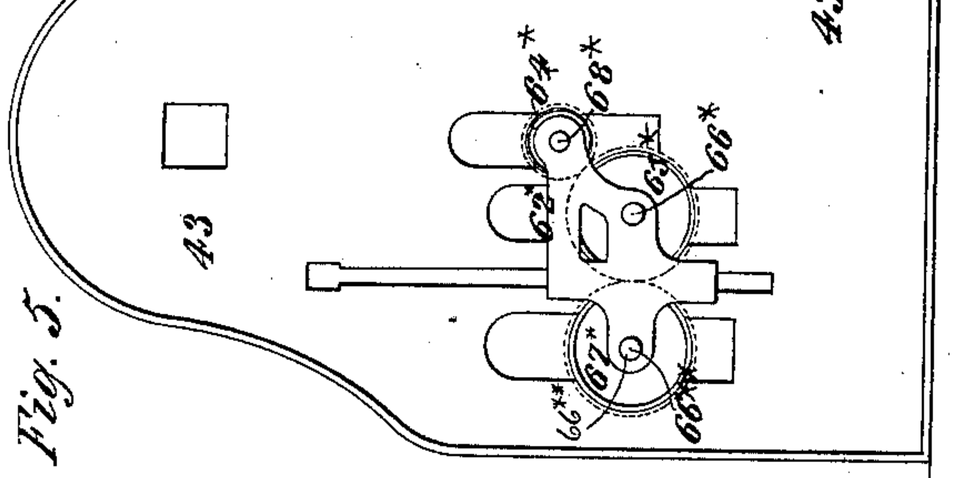
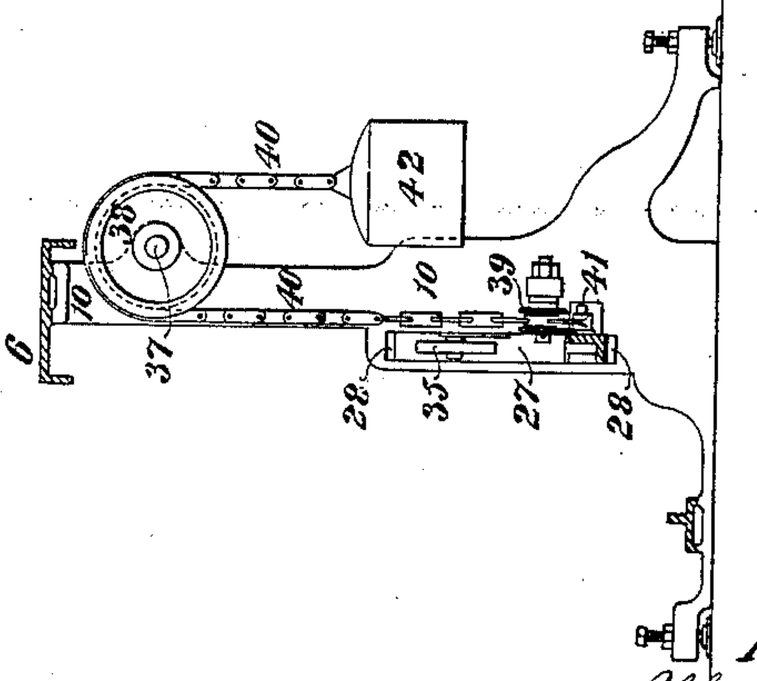


Fig. 2.



Witnesses:
Chas. F. Haynes
Ed L. Moran

Inventors:
Alfred Higgins,
Executor of James Higgins, Dec'd.
By Thomas S. Whitworth
by their Attorneys
Brown & Brown

(No Model.)

4 Sheets—Sheet 3.

J. HIGGINS & T. S. WHITWORTH.

A. HIGGINS, Executor of J. HIGGINS, Dec'd.

SLUBBING AND ROVING FRAME.

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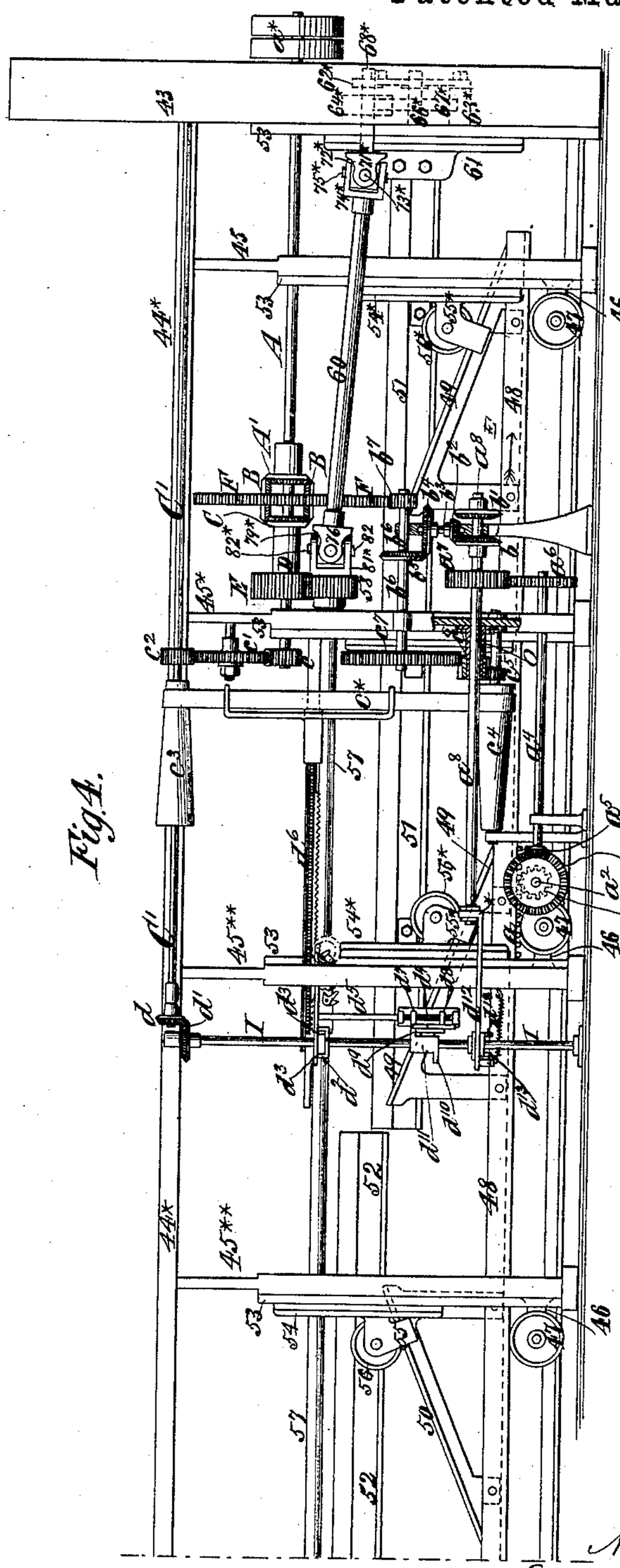
Fig. 4.



Witnesses:
C. Hall.
O. Sundgren

Inventors:
Alfred Higgins
Executor of James Higgins, Dec'd.
Thos. S. Whitworth
by their Attys
Brown & Brown

(No Model.) 4 Sheets—Sheet 4.

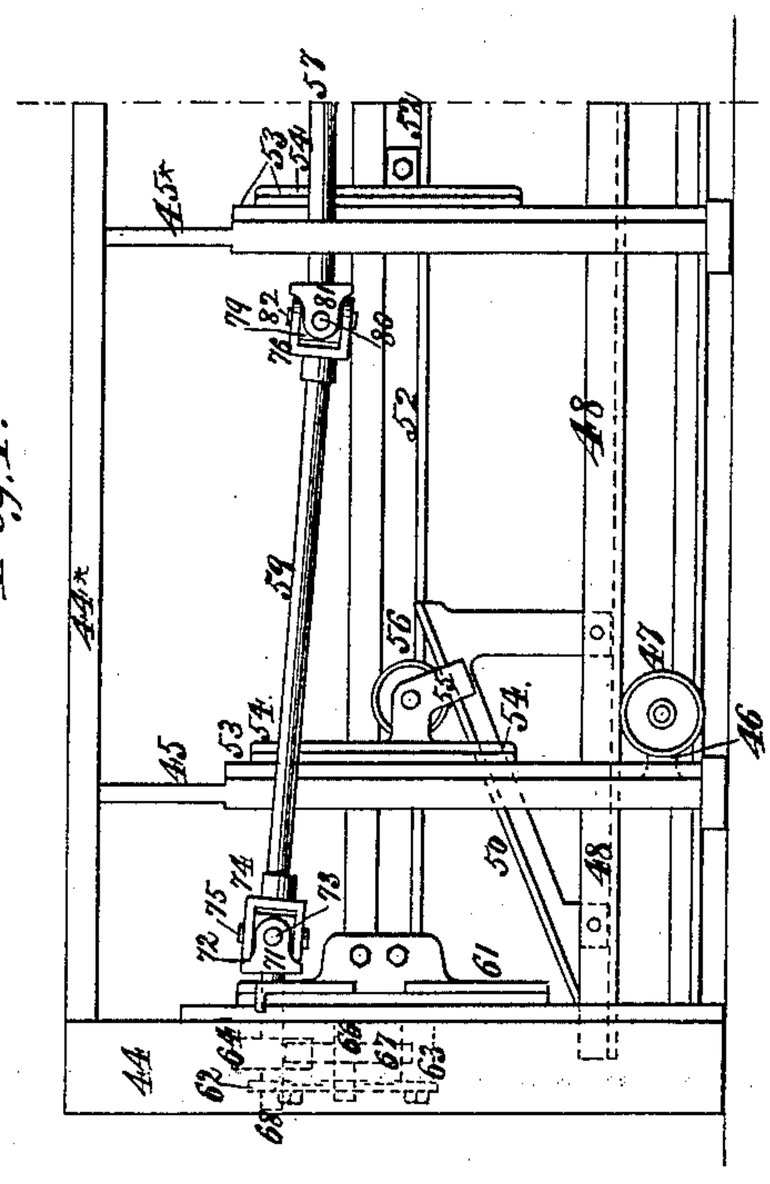
J. HIGGINS & T. S. WHITWORTH.

A. HIGGINS, Executor of J. HIGGINS, Dec'd.

SLUBBING AND ROVING FRAME.

No. 341,574. Patented May 11, 1886.

Fig. 4.



Witnesses:

C. Hall

O. Sundgren

Inventors:

Alfred Higgins,

Executor of James Higgins, Dec'd.

Thos. S. Whitworth

by their Attys

Brown & Brown

UNITED STATES PATENT OFFICE.

ALFRED HIGGINS, EXECUTOR OF JAMES HIGGINS, DECEASED, AND THOMAS SCHOFIELD WHITWORTH, OF SALFORD, COUNTY OF LANCASTER, ENGLAND, ASSIGNORS TO THE PETTEE MACHINE WORKS, OF NEWTON UPPER FALLS, MASSACHUSETTS.

SLUBBING AND ROVING FRAME.

SPECIFICATION forming part of Letters Patent No. 341,574, dated May 11, 1886.

Application filed July 28, 1882. Serial No. 67,895. (No model.) Patented in England July 22, 1881, No. 3,208, and in Germany January 30, 1882, No. 4,539.

To all whom it may concern:

Be it known that JAMES HIGGINS, deceased, late of Salford, in the county of Lancaster, England, and THOMAS SCHOFIELD WHITWORTH, of the same place, did invent certain new and useful Improvements in Slubbing and Roving Frames, of which the following is a specification, reference being had to the accompanying drawings.

This invention consists in a novel combination of mechanism for imparting the necessary rising-and-falling motion to the copping-rails of slubbing and roving frames by means of inclines, as hereinafter fully described.

The invention also consists in the combination, with two copping-rails arranged end to end in a roving or slubbing frame, of a novel arrangement and combination of mechanism whereby they are raised and lowered, and are caused to counterbalance each other, so that the weight of one rail in descending will aid in raising the other rail, and will thereby lessen the power necessarily employed in operating or moving the rails.

The invention also consists in a novel combination of mechanism whereby motion is transmitted from a driving-shaft mounted in fixed bearings to the bobbin-shaft or bobbin-shafts carried by the copping-rail, while permitting of the movement of said bobbin shaft or shafts with said rail, as particularly hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation of so much of a roving or slubbing frame as is requisite to illustrate the application of the invention. Fig. 2 is a vertical cross-section on the line A B of Fig. 1, looking in the direction of the left hand of the drawings. Fig. 3 is a vertical cross-section of Fig. 1, taken upon the line C D and looking in the direction toward the right hand of the drawings, similar letters of reference being placed upon corresponding parts in each of the figures. Fig. 4 is a front elevation of a roving or slubbing frame having its copping-rail divided into two portions, or formed by or of two separate sections or rails placed end to end, the figure being shown upon two sheets, in order to permit of its illustration on a larger scale than would otherwise be possible; and Fig. 5 is an elevation of the right-hand end of the machine shown in Fig. 4.

4 5, Fig. 1, are the end frames of the slubbing or roving frame, between which extends in a longitudinal direction the roller-beam 6, supported at intervals by the pieces 7 8 9 10, commonly known as "spring-pieces" or "samsons."

Upon the spring-pieces 7 8 9 10 are formed projecting brackets 11 12 13 14, provided with studs 15 16 17 18, carrying bowls 19 20 21 22, capable of turning freely upon the said studs 15 16 17 18.

Resting upon the bowls 19 20 21 22 is a rail or bar, 23, extending in the direction of the length of the frame and capable of being traversed to and fro lengthwise upon the bowls or rollers 19 20 21 22, as hereinafter described.

Carried upon the bar 23 are inclines 24 25 26 27. Such inclines are formed with projecting parts bolted on the said bar 23.

Within the spring-pieces 7 8 9 10 are formed openings 28, (seen only in Figs. 2 and 3,) through which openings the said inclines 24 25 26 27 pass when the bar 23 is traversed in the direction of its length, as will be hereinafter described, such openings 28 serving as guides for maintaining the inclines 24 25 26 27 and bar 23 in a vertical position.

Upon the spring-pieces 7 8 9 10 are projecting strips or ribs 29, which serve as vertical guides to brackets 30, secured to the copping-rail 36 by bolts.

Upon the brackets 30 are formed projecting brackets 31, carrying studs upon which are bowls or rollers 32 33 34 35, capable of rotating upon the said studs. The bowls 32 33 34 35 rest upon the upper surfaces of the inclines 24 25 26 27, respectively, and serve to support the bobbin or copping rail 36. An extension, 31*, of the brackets 31 passes below the inclines, so as to partially embrace them, the purpose of which we shall hereinafter point out. The longitudinal bar 23 we connect in any suitable manner to the usual copping-motion of the slubbing or roving frame, so that

such copping-motion will cause the bar to be traversed to and fro in the direction of its length.

As here represented, bar 23 has upon it a rack, a, with which engages a pinion, a', mounted on a short shaft, a^2, which also carries a bevel-wheel, a^3.

a^4 is a horizontal shaft on which is a bevel-pinion, a^5, which gears with and turns the wheel a^3, and the shaft a^4 is driven by wheels a^6 a^7 from a shaft, a^8, on which are oppositely-arranged wheels b b', with one or the other of which engages a bevel-pinion, b^2, fixed to a shaft, b^3. The wheels b b' are alternately put into gear with the pinion b^2 and the shafts a^4 a^8, driven alternately in opposite directions, in order to move the bar 23 backward and forward.

On the upper end of the shaft b^3 is a bevel-wheel, b^4, with which engages a pinion, b^5, on a horizontal shaft, b^6.

A is the main driving-shaft, on which are pulleys a^*, and fast on said shaft is a bevel-wheel, A', gearing into the carrier bevel-wheels B B, which also gear into a bevel-wheel, C, fast upon a sleeve, D, which is free to rotate on the shaft A, and has also fast upon it a wheel, E. A wheel, F, is mounted on the shaft A, so as to be capable of rotation thereon. The wheel F gears into a wheel, b^7, fast on the shaft b^6.

Fast upon the shaft A is a wheel, c, which, through wheels c' c^2, transmits motion to a shaft, C', on which is a cone-drum, c^3. From the drum c^3 a belt, c^*, transmits motion to the cone-drum c^4.

Fast on the shaft of the cone-drum c^4 is a gear-wheel, c^5, and on the shaft b^6 is a gear-wheel, c^7.

c^6 designates a gear-wheel having a broad face and gearing into both the wheels c^5 c^7. The wheel c^6 turns loosely on a tubular stud, o, which projects from the frame of the machine, and through which the shaft a^8 passes. The shaft A therefore transmits motion to the shaft C', which, by means of the cone-drums, belt, and gearing c^5 c^6 c^7, rotates the shaft b^6, and the latter, through the pinion b^7, operates the wheel F, which carries the axes of the wheels B B, whereby rotary motion from the shaft A is transmitted to the sleeve D and wheel E.

I is an upright shaft mounted in bearings on the frame and carrying at the upper end a mutilated wheel, d', which is periodically caused to gear with a wheel, d, on the shaft C', so as to be rotated thereby.

d^2 are pins carried by a disk on the shaft I, and which are at times acted upon by inclines formed within the plate d^3, which is, as usual, traversed in one or other direction by means of a spring charged with power and rotates the shaft I, so as to make the mutilated wheel d' gear with the wheel d at the proper times.

Carried by the copping-rail 36 is the usual shortening screw, d^4, formed upon a shaft, d^5, which is periodically rotated by the rack d^6, as usual, thereby causing the plates d^7 d^8 to be removed from one or other of the projecting parts d^9 d^{10} of the cam d^{11} on the shaft I. The plate d^{12} is provided with a lug or ear, *, fitting between collars on the shaft a^8. When the copping-rail 36 arrives at the highest or lowest point of its travel, the plates d^7 d^8 are carried clear of one or other of the projecting parts d^9 d^{10} of the cam d^{11}, thereby permitting the plate d^3 to rotate the shaft I, so as to cause the mutilated wheel d' to be rotated by the wheel d, and so rotate the shaft I half a revolution, thereby causing the pins d^{13} to act upon inclined recesses in the plate d^{12} to traverse said plate d^{12} and the shaft a^8 in one or other direction, and to cause the wheels b b' to alternately gear with the wheel b^2. The to-and-fro motion of the bar 23 causes the copping-rail 36 to be raised and lowered as follows: Supposing that the bar 23, with the inclines 24 25 26 27, is being traversed in the direction of the arrow E, the inclines 24 25 26 27 acting upon the bowls 32 33 34 35, will cause the copping-rail 36 to be elevated; but when the bar 23 and the inclines 24 25 26 27 are traversed in a direction opposite to that of the arrow E the copping-rail will be allowed to descend as the inclines 24 25 26 27 recede from the bowls 32 33 34 35. By the copping motion of the roving or slubbing frame acting upon the bar 23, so as to traverse it a greater or less degree, the building of the slubbing or roving upon the bobbin is effected. If the bobbin or copping-rail 36 should from any cause not descend when the inclines are receding, the under side of the inclines 24 25 26 27, acting against the projecting parts 31* of the brackets 31, will cause the copping-rail 36 to be drawn downward.

To the spring-piece 10 is secured a stud, 37, upon which and turning freely thereon is a grooved pulley, 38. Passing over this pulley 38, and partially around a pulley, 39, turning loosely upon a stud carried by the spring-piece 10, is a chain, 40, one end thereof being secured to a stud or bracket, 41, attached to the bar 23, the other end of the chain 40 being provided with a weight, 42. Such weight 42, tending to draw the bar 23 in the direction of the arrow E, acts as a counterpoise or balance-weight to the copping rail 36, the weight of which tends to force the inclines 24 25 26 27 and the bar 23 in a direction opposite to that in which the weight 42 acts upon the bar 23.

The second part of the invention is shown by Figs. 4 and 5. In these figures 43 44 are end frames of a slubbing or roving frame, between which extends in a longitudinal direction the roller-beam 44*, supported at intervals by the pieces, commonly known as "spring-pieces" or "samsons," 45 45* 45**.

Upon the spring-pieces 45 45* 45** are formed projecting brackets 46, provided with studs or pins, upon which, capable of turning freely thereon, are bowls 47. Upon the cir-

cumferences of the bowls 47, and supported thereby, is a bar, 48.

At 49 50 are inclines carried by the bar 48 and secured thereto by means of bolts.

At 51 52 are the copping or bobbin rails.

As both of the copping-rails are similar in construction, we shall apply similar letters of reference to the appurtenances of each portion and distinguish them by the addition of an asterisk, (*.)

Upon the spring-pieces 45 45* 45** are formed projecting ribs 53, upon which slide brackets 54, attached to the copping-rails 51 52, such ribs 53 acting as vertical guides to the copping-rails 51 52.

Formed upon the brackets 54 54* are brackets 55 55*, provided with studs, such studs carrying bowls 56 56*, free to turn thereon, such bowls resting upon the inclines 49 50, by which the copping-rails 51 52 are supported.

The bar 48 we connect to the usual "copping-motion" in any convenient manner so as to cause it to be traversed to and fro in the direction of its length.

As here shown, the bar 48 is provided with a rack, *a*, and is reciprocated from the shaft b^6 by means of the same arrangement of shafts a^2 a^4 a^8 b^3 and wheels and pinions a' a^3 a^5 a^6 a^7 b b' b^2 b^4 b^5, as is represented for moving the bar 23 in Fig. 1.

The arrangement of mechanism for controlling the machine from the driving shaft A is as shown in Fig. 1, and the parts are designated by the same letters of reference. The traversing motion of the bar 48 will, by means of the inclines 49 50, acting upon the bowls 56 56*, cause the copping-rails 51 52 to be raised and lowered; but it will be seen by the drawings that the inclines 49 are placed in an opposite direction to the inclines 50, so that when the bar 48 is being traversed in the direction of the arrow E, placed thereon, the inclines 49, acting through media of the bowls 56*, will cause the copping-rail 51 to ascend; but the inclines 50 being dr wn from beneath the bowls 56 the copping-rail 52 will be allowed to descend, the weight of the copping-rail 52 keeping the bowls 56 in contact with the inclines 50 while such descent is taking place. A continued traversing of the bar 48 will raise the copping-rail 51 to its highest position, and allow the copping-rail 52 to descend to its lowest position. Upon the bar 48 being traversed in a direction opposite to that of the arrow E, as previously described, the inclines 50, acting upon the bowls 56, will now cause the copping-rail 52 to ascend, and the inclines 49 will allow the copping-rail 51 to descend. The traversing to and fro of the bar 48 being controlled by the usual copping or shortening motion, the roving or slubbing will be wound upon the bobbin in any ordinary manner. By placing the inclines 49 50 in opposite directions upon the bar 48, as shown, so as to cause one rail to ascend while the other is descending, we thereby utilize the weight of the copping-rail 52 to counterbalance the weight of the other copping-rail, 51, thereby dispensing with the weights usually employed for counterbalancing the copping-rails of slubbing and roving frames. 57 (see Fig. 4) is a shaft capable of being rotated in fixed bearings carried by the spring-pieces 45* 45**. This shaft 57 may be considered as the driving-shaft for the bobbin shaft of the copping-rails.

Fast on the shaft 57 is a wheel, 58, which gears into and receives motion from the wheel E, which turns with the sleeve D on the shaft A. The shaft 57 is prevented from being moved in longitudinal direction by the boss of the jaw 81 and the boss of the wheel 58. At each end of the shaft 57 are shafts 59 60, by which rotary motion is transmitted to the bobbin-shafts of the copping-rails 51 52, as will be hereinafter described.

As the arrangements hereinafter to be described, by which rotary motion is transmitted from the shaft 57 to the bobbin-shafts of the copping-rails 51 52, are similar, we shall confine our description to one of such arrangements, and upon the other we shall affix similar letters of reference, with the addition of an asterisk, (*.)

Within a bracket, 61, secured to the copping-rail 52 and capable of being rotated and slid longitudinally therein, is a short shaft, 68, the outer end of such shaft being supported by a cross-bar, 62, bolted to projecting parts 63, formed upon the bracket 61.

The bracket 61, cross-bar 62, and parts 63 constitute a frame carried by the copping-rail 52, and a similar frame is carried by the rail 51.

Fast upon the shaft 68 is formed a jaw, 71, embracing a block, 72, formed upon which are projecting studs 73, passing into apertures formed within the jaw 71.

Upon the shaft 68 and fast thereon is a toothed wheel, 64, gearing into a wheel, 65, mounted fast upon one of the bobbin-shafts 66, this wheel 65 gearing into another wheel, 67, mounted fast upon the other bobbin-shaft, 66*, carried by the bobbin-rail 52.

At the right-hand end of the drawing, Fig. 4, the bobbin-shafts 66* 66** are carried by the bobbin-rail 51. In cases where there is only one line of spindles to be driven there will be one only of such bobbin-shafts aforesaid carried by each copping-rail 51 52.

Upon the shaft 59 is formed a jaw, 74, embracing the block 72, formed upon which are projecting studs 75, passing into apertures formed within the jaw 74.

Upon the end of the shaft 59, opposite to that previously referred to, is formed a jaw, 76, embracing a block, 79, provided with studs 80, (only one of such studs showing in the drawings,) passing into apertures formed in the jaw 76, one side only of such jaw showing in the drawings. The block 79 is also embraced by a jaw, 81, the block 79 being provided with projecting studs 82, passing into apertures formed in the jaws 81.

Upon rotary motion being imparted to the

shaft 57 through the toothed-wheel 58 rotary motion will be transmitted, by means of the jaw 81, studs 82, block 79, studs 80, and jaw 76, to the shaft 59, the jaw 81, studs 82, block 79, studs 80, and jaw 76 forming a kind of universal coupling, which is well-known as a "Hook's joint." Such joint enables the shaft 59 to occupy an angular position to the shaft 57, while at the same time it is being rotated thereby. The shaft 59, through media of the jaw 74, studs 75, block 72, studs 73, and projecting parts 71, imparts rotary motion to the short shaft 68, which shaft, through the wheels 64 65 67, gives rotary motion to the bobbin-shafts, by which the bobbins are rotated. The parts 74 75 72 73 71 also constitute a Hook's joint, as before referred to, thereby enabling the shaft 59 to occupy an angular position in relation to the shaft 68 while transmitting rotary motion thereto.

While the copping-rails 51 52 are raised and lowered, as previously described, by the movement of the bar 48, the axes of the shafts 59 60 rise above and fall below the axis of the shaft 57, from which the shafts 59 60 receive rotary motion, the Hook's joints, as previously described, permitting such rising and falling of the shafts 59 60 to take place, and at the same time transmit rotary motion from the shaft 57 to the shafts 68 68*, and through means of the wheels 64 65 67 impart motion to the bobbin-shafts 66 66*. As the ends of the shafts 59 60 are raised and lowered by the upward and downward motion of the copping-rails 51 52, the shafts 68 68* will be caused to move longitudinally within the brackets 61 61* and the cross bar 62 62*, the wheels 64 64* being made of sufficient breadth to prevent their passing out of gear when the shaft 68 is slid longitudinally.

The arrangement as above described may also be applied for transmitting motion to the bobbin-shafts of other roving and slubbing frames than those having two copping-rails, as previously described; but in such cases it will be only necessary to employ one of the shafts 59 60 for transmitting rotary motion to the bobbin shaft or shafts.

What is claimed as the invention, and desired to be secured by Letters Patent, is—

1. The combination, with the copping-rail of a roving or slubbing frame, of brackets to which said rail is secured, guides wherein said brackets may rise and fall, rollers pivoted in said brackets, a horizontal bar carrying inclines upon which rest the aforesaid rollers, and mechanism for imparting a to-and-fro longitudinal movement to said bar, for the purpose of producing the rising-and-falling movement of said copping-rail, substantially as herein described.

2. The combination, with two copping-rails arranged end to end in a roving or slubbing frame, of brackets to which said rails are secured, guides wherein said brackets may rise and fall, a horizontal bar carrying inclines which support said brackets and rails, the inclines which support the one rail being set reversely to the inclines which support the other rail, so that the two rails will balance each other, and mechanism for imparting a to-and-fro longitudinal movement to said bar and inclines, substantially as herein described.

3. The combination of the two copping-rails 51 52, brackets 54 54*, guides 53, rollers 56, horizontal bar 48, inclines 49 and 50, the latter inclines being set reversely to the former, 49, supporting-rollers 47 for said bar 48, and mechanism for imparting a to and fro longitudinal movement to said bar, substantially as herein described.

4. The combination, with the copping-rail of a roving or slubbing frame and a bobbin shaft or shafts carried thereby, of mechanism for imparting a rising-and-falling motion to said rail, a frame attached to and moving with said rail, a short shaft adapted to slide longitudinally in said frame, and gearing carried by said frame for transmitting motion from said short shaft to said bobbin shaft or shafts, a driving-shaft mounted in fixed bearings, and an adjustable shaft and universal couplings or Hook's joints connecting it with said sliding shaft and said driving-shaft, whereby motion is transmitted from said driving-shaft to said bobbin shaft or shafts while permitting of the movement of the latter with the copping-rail, substantially as herein described.

ALFRED HIGGINS,
Executor of the last will and testament of James Higgins, deceased.

THOMAS SCHOFIELD WHITWORTH.

Witnesses:
ALBERT E. HALL,
9 *Mount St., Manchester, Eng.*
W. T. CHEETHAM,
Patent Agent, 18 *St. Ann's St., Manchester.*