(No Model.)

4 Sheets—Sheet 1.

H. J. COLBURN.

CIRCULAR SAWING MACHINE.

No. 250,425. Patented Dec. 6, 1881.

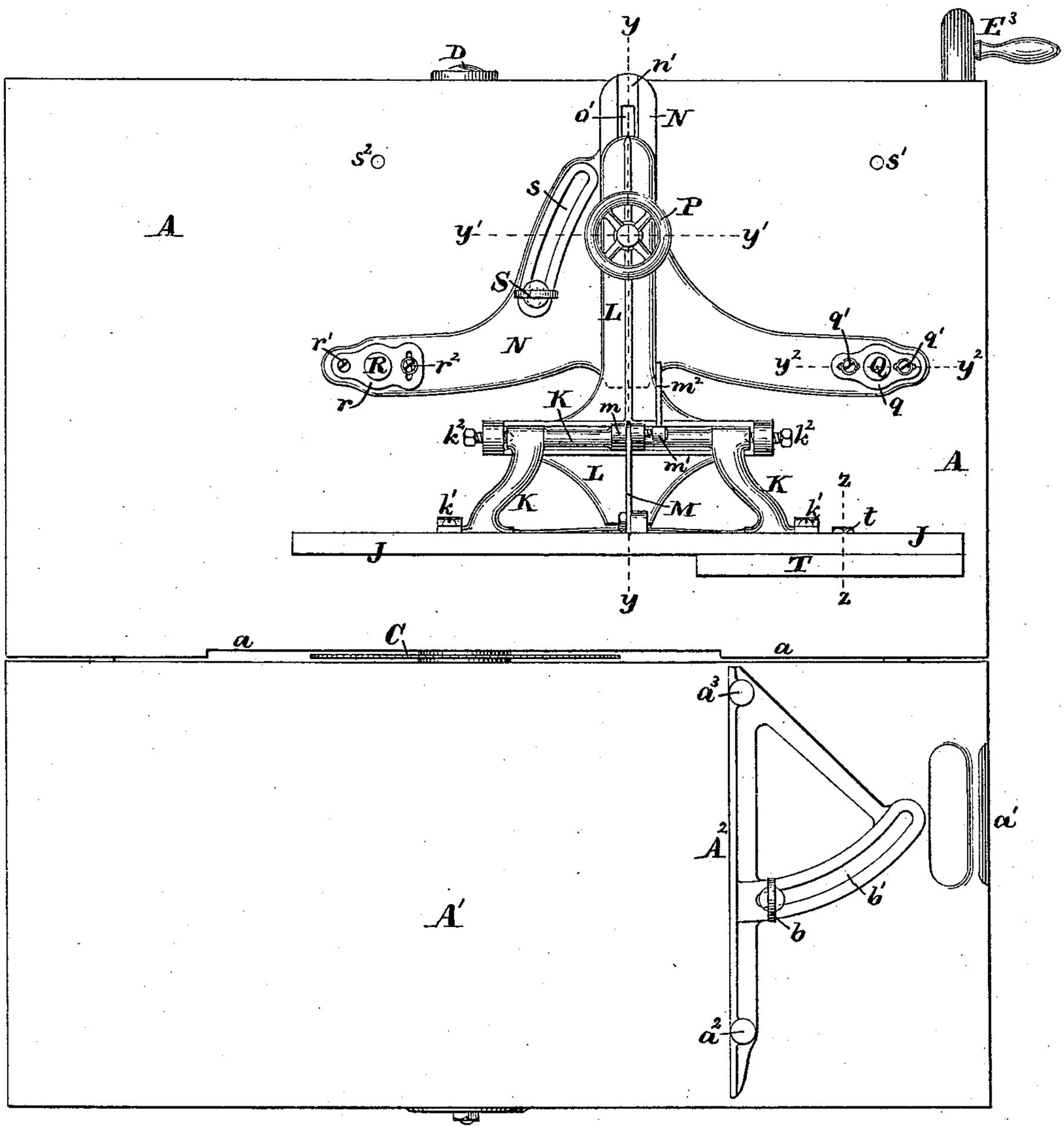

Fig. 1.

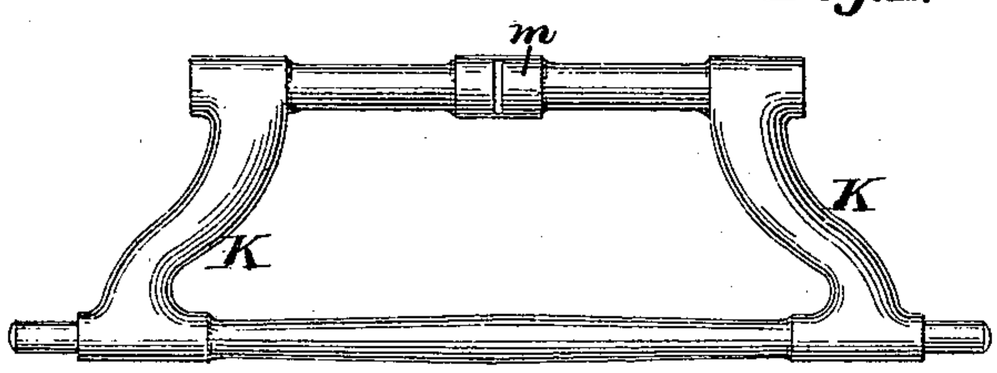

Fig. 14.

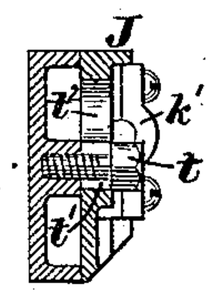

Fig. 13.

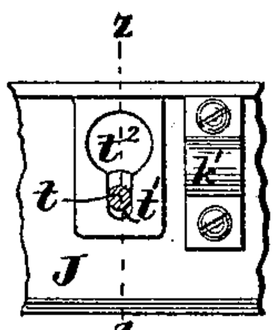

Fig. 12.

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Inventor:

Henry J. Colburn

by N. E. Lombard

Attorney.

(No Model.) 4 Sheets—Sheet 2.

H. J. COLBURN.

CIRCULAR SAWING MACHINE.

No. 250,425. Patented Dec. 6, 1881.

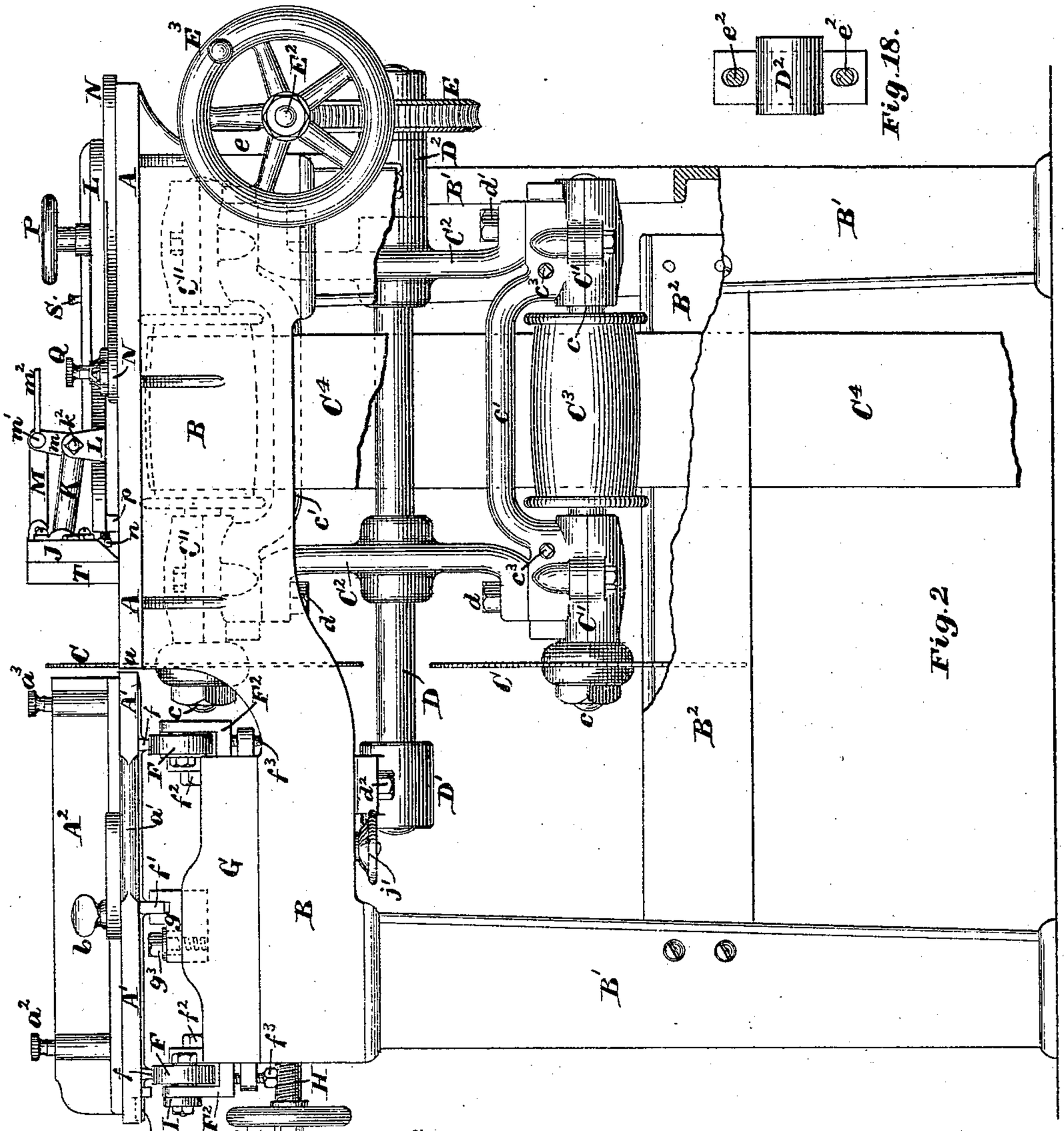

Fig. 2

Fig. 18.

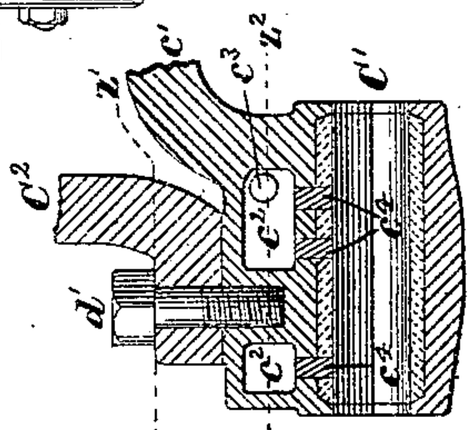

Fig. 15.

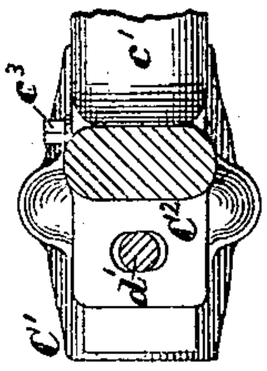

Fig. 16

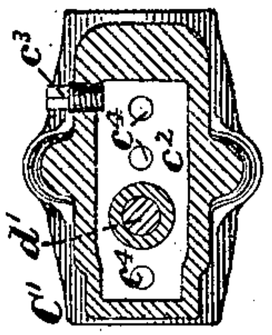

Fig. 17.

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(No Model.)

4 Sheets—Sheet 3.

H. J. COLBURN.

CIRCULAR SAWING MACHINE.

No. 250,425. Patented Dec. 6, 1881.

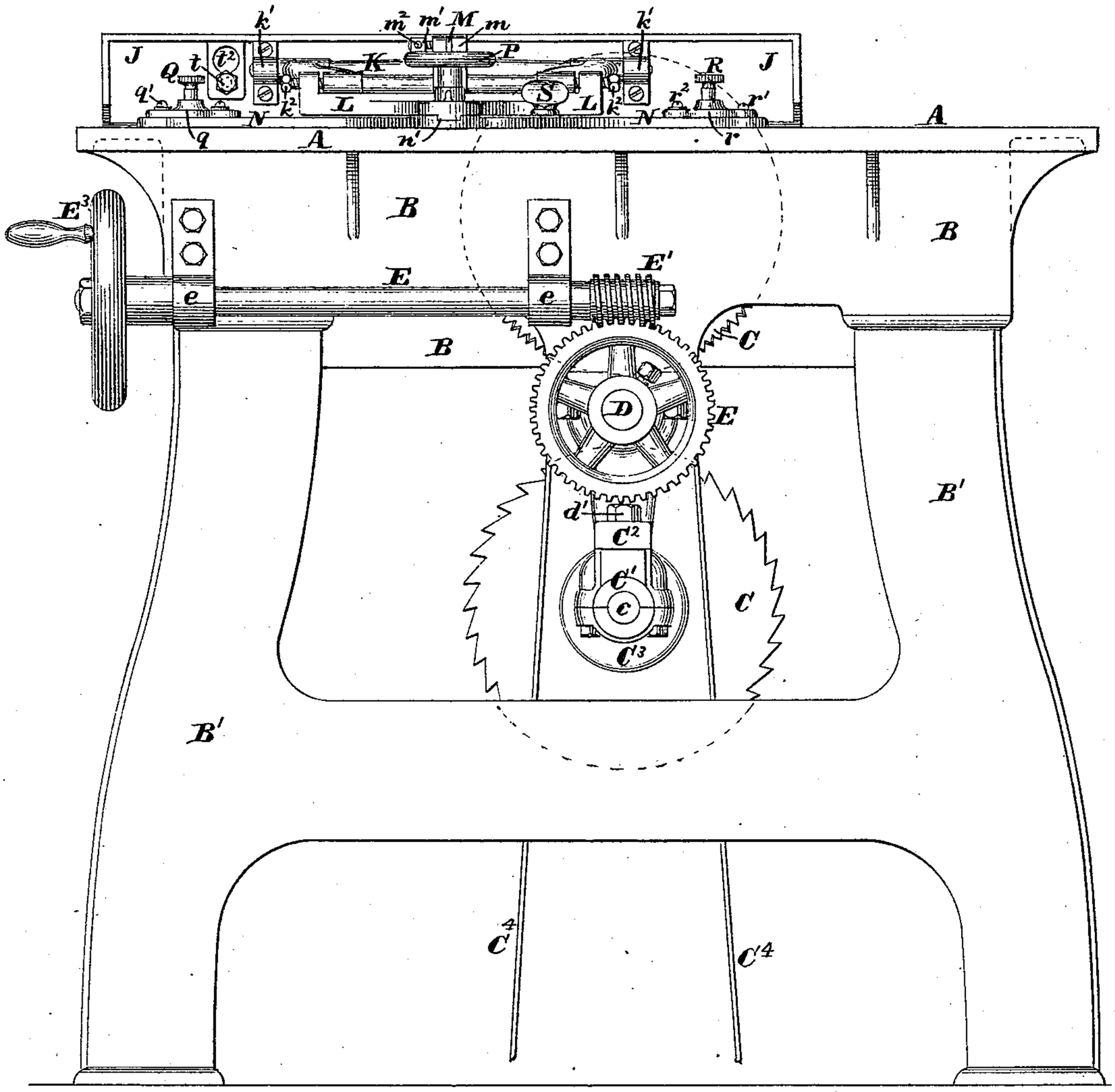

Fig. 3.

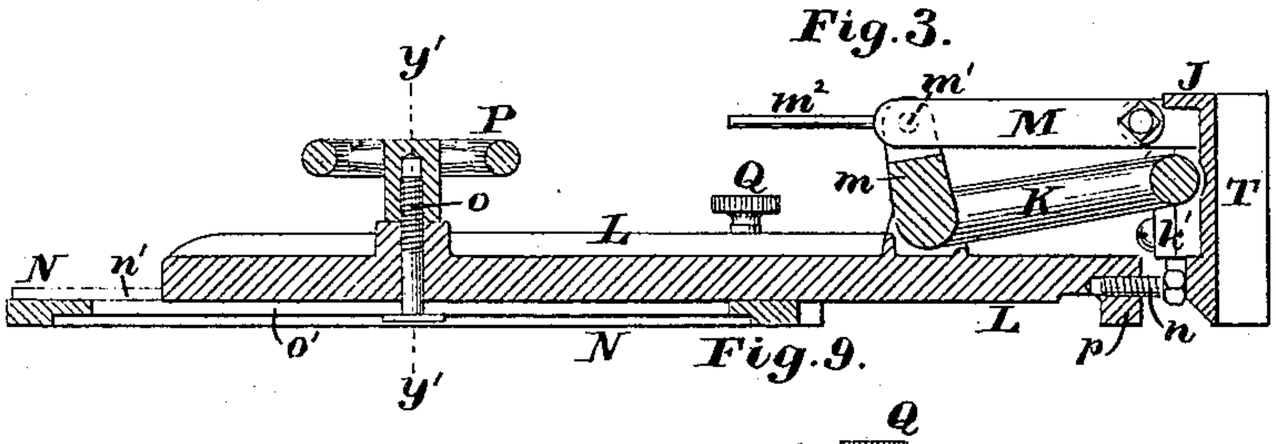

Fig. 9.

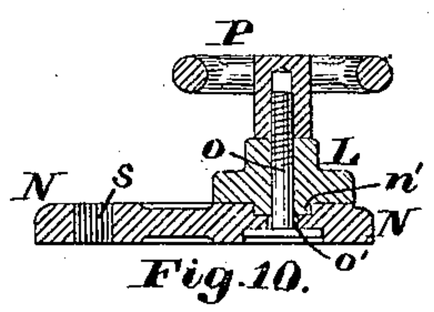

Fig. 10.

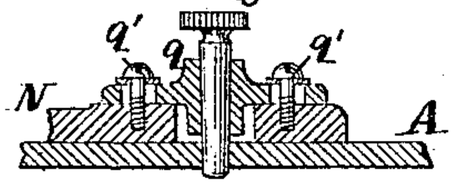

Fig. 11.

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(No Model.) 4 Sheets—Sheet 4.

H. J. COLBURN.

CIRCULAR SAWING MACHINE.

No. 250,425. Patented Dec. 6, 1881.

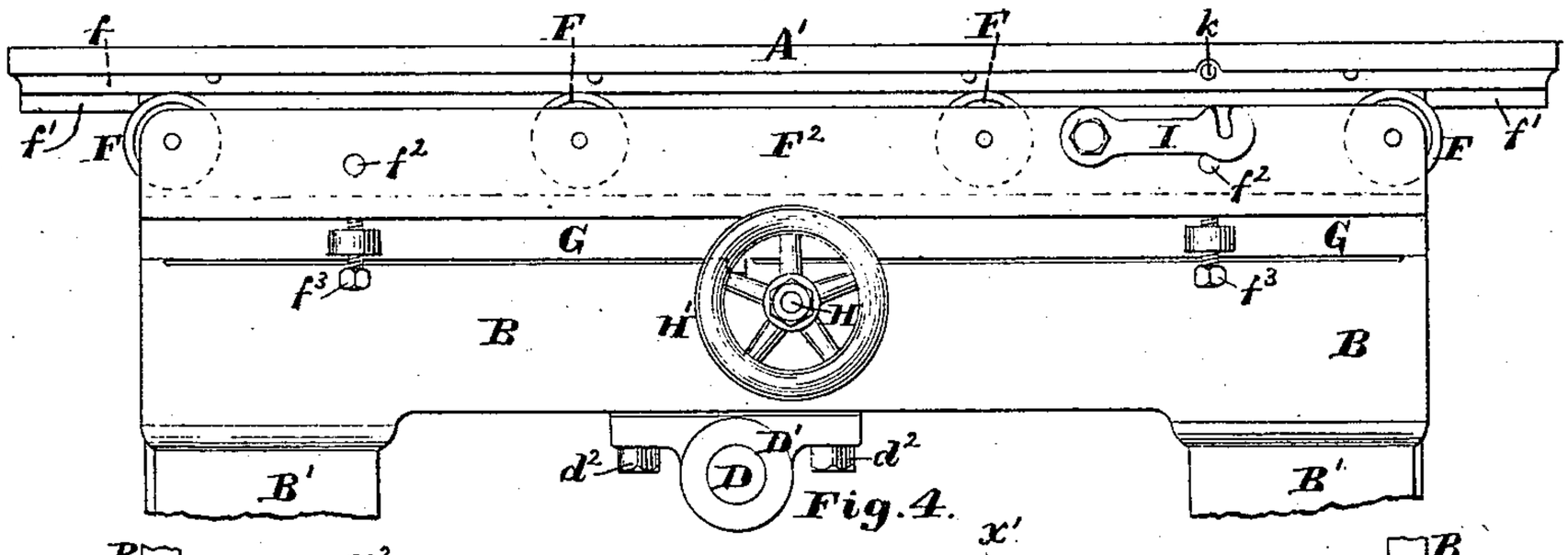

Fig. 4.

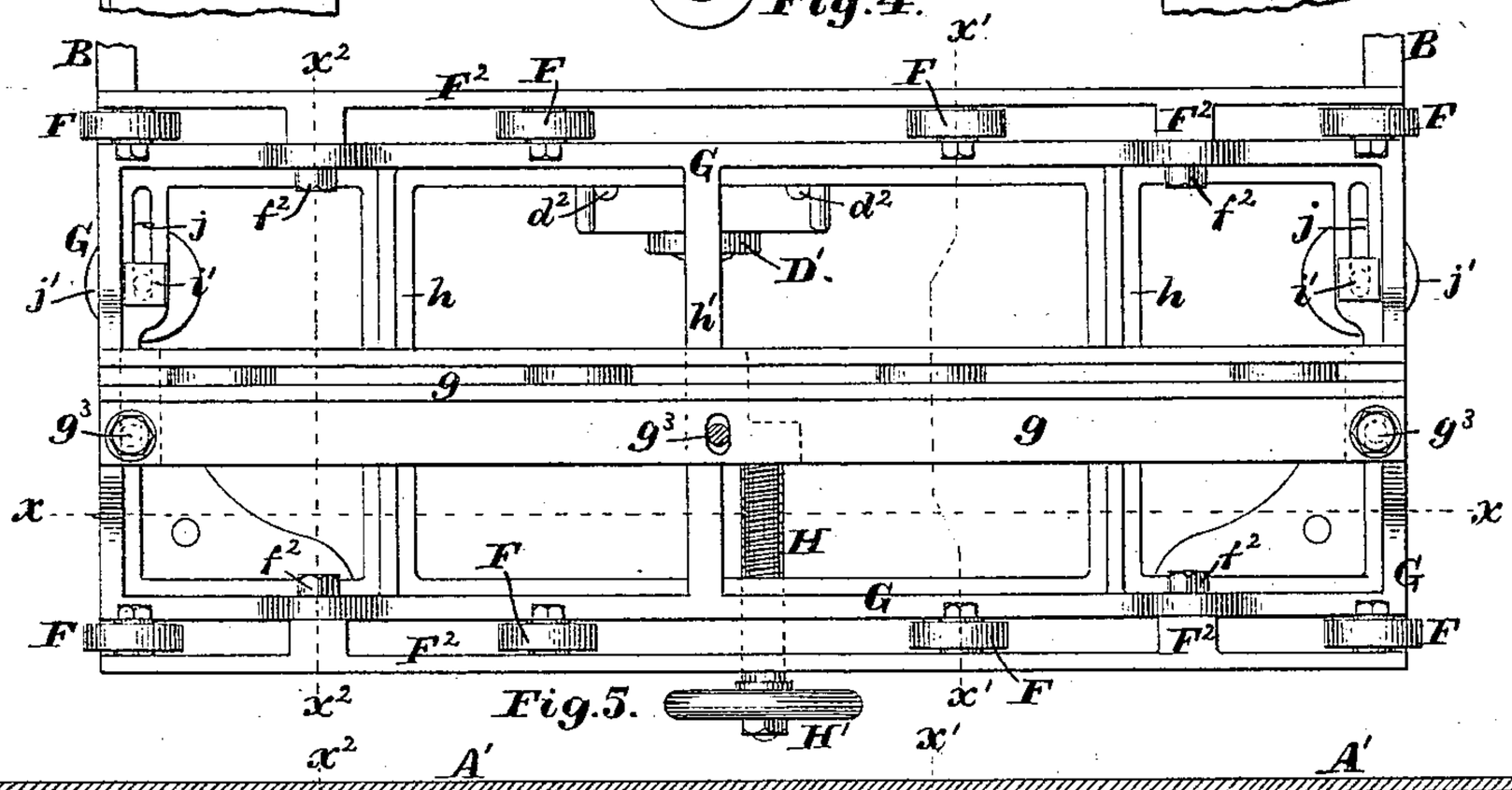

Fig. 5.

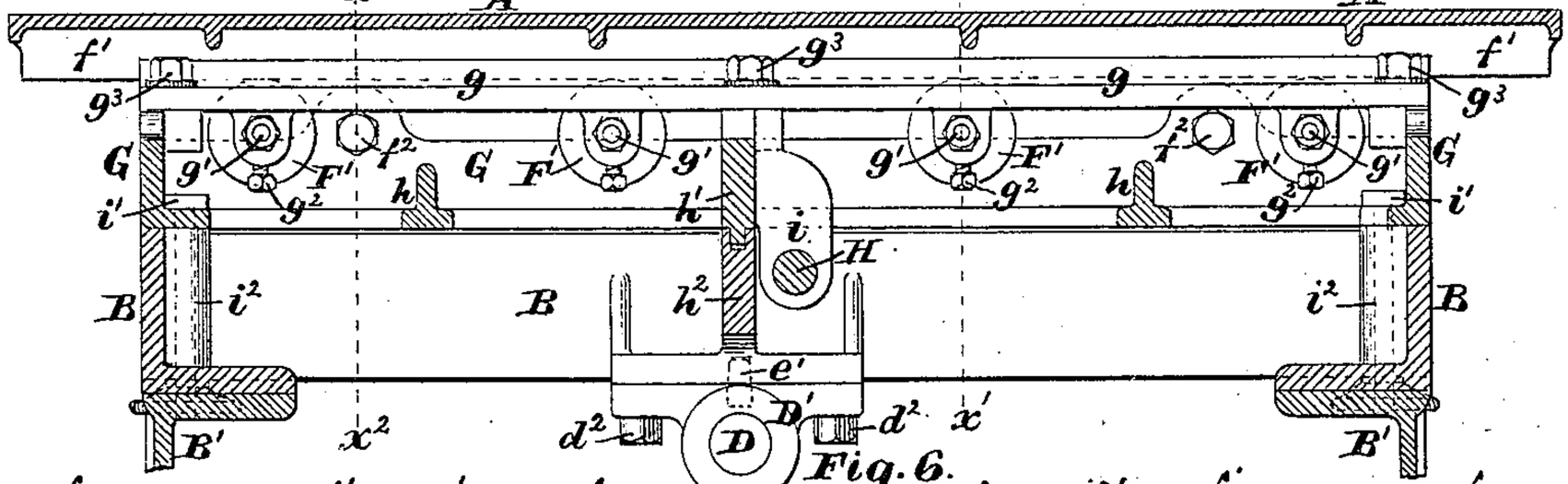

Fig. 6.

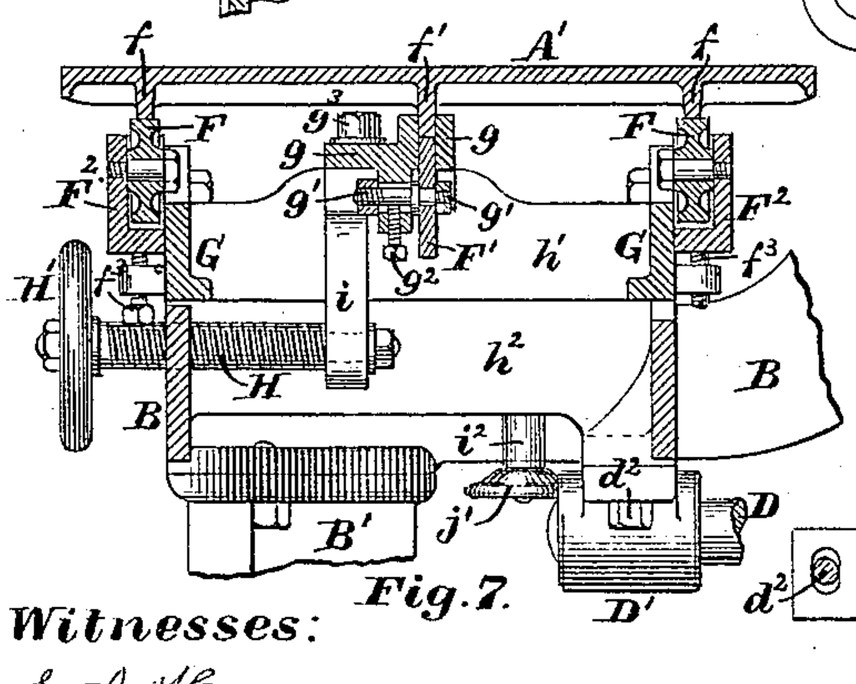

Fig. 7.

Fig. 19.

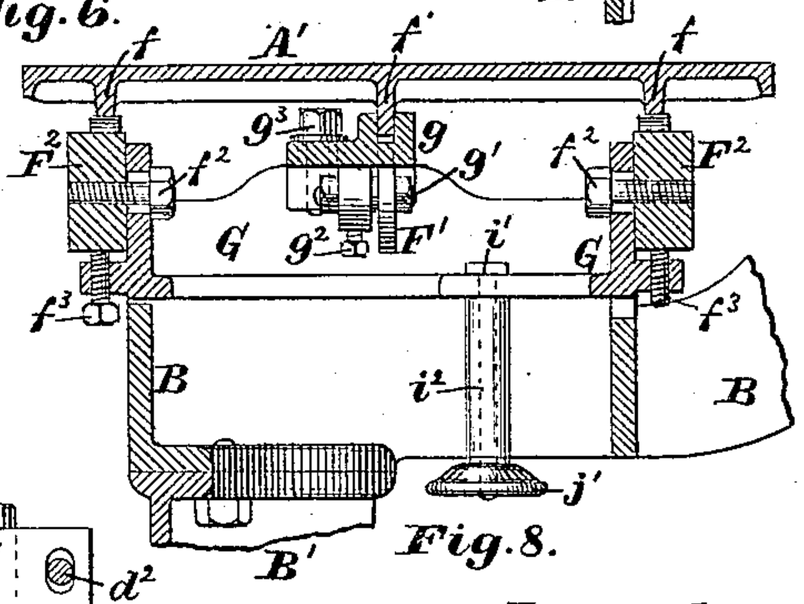

Fig. 8.

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Walter D. Lombard.

Inventor:
Henry J. Colburn
by N. D. Lombard
Attorney.

UNITED STATES PATENT OFFICE.

HENRY J. COLBURN, OF FITCHBURG, MASS., ASSIGNOR OF ONE-HALF TO CHARLES T. CROCKER AND HENRY F. COGGSHALL, OF SAME PLACE.

CIRCULAR SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 250,425, dated December 6, 1881.

Application filed April 11, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. COLBURN, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Circular Sawing Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to certain improvements in circular sawing machines; and it consists in an improved method of mounting, guiding, and adjusting a reciprocating or sliding section of the table, an improved construction of and manner of mounting and adjusting the rear gage, a novel method of securing a removable plate to the front of said gage, and an improved method of oiling the saw-arbors, all of which will be best understood by reference to the description of the drawings, and the claims to be hereinafter given.

In the drawings, Figure 1 is a plan of a machine embodying my invention. Fig. 2 is a front elevation of the same, with a portion of one of the leg-frames and the driving-belt broken away. Fig. 3 is a side elevation. Fig. 4 is a partial elevation of the opposite side. Fig. 5 is a partial plan with the sliding table removed. Fig. 6 is a section on line *x x* on Fig. 5, showing the sliding table in its working position. Fig. 7 is a section on line *x' x'* on Figs. 5 and 6. Fig. 8 is a section on line x^2 x^2 on Figs. 5 and 6. Fig. 9 is a section of my improved gage and mechanism for adjusting the same, the cutting-plane being on line *y y* on Fig. 1. Fig. 10 is a section on line *y' y'* on Figs. 1 and 9. Fig. 11 is a section on line y^2 y^2 on Fig. 1. Fig. 12 is a rear elevation of a small portion of the gage. Fig. 13 is a section of the same on line *z z* on Figs. 1 and 12. Fig. 14 is a detail of the radius-frame to which the gage is pivoted. Fig. 15 is a vertical section of one of the boxes in which the saw-arbors have their bearings. Fig. 16 is a horizontal section on line *z' z'* on Fig. 15. Fig. 17 is a horizontal section on line z^2 z^2 on Fig. 15. Figs. 18 and 19 are respectively an inverted plan and a plan of the bearings for the shaft upon which is mounted the saw-carrying frame.

A is the main table, cast in one piece with the frame B, supported upon the two leg-frames B' B', which are connected together by the tie-girts B^2 B^2.

C C are two circular saws, one of them being shown as a cross-cut and the other a splitting saw, mounted upon the ends of the arbors *c c*, each of which has its bearings in two boxes, C' C', said boxes being connected rigidly together by the yoke *c'*.

Two arms, C^2 C^2, are secured at their centers to a shaft, D, which has its bearings in the boxes D' and D^2, said arms having bolted to their opposite ends the four boxes C', and, together with the yokes *c' c'*, constitute a swing-frame, which by its partial rotation with the shaft D can be made to carry either saw into position for cutting, or can vary the height to which said saw shall project above the top of the table A when cutting grooves or rabbeting. Each of the arbors *c c* has mounted thereon a pulley, C^3, to which motion is imparted by the driving-belt C^4.

The shaft D has secured thereon at its rear end the worm-gear E, to which motion is imparted at the proper times by the worm E' secured upon the shaft E^2, said shaft having its bearings in the boxes *e e*, bolted to the frame B, and being provided at its front end with the hand-wheel E^3, by which it may be revolved, and thus the position of the saws can be conveniently and readily adjusted.

In order that the saws C C may be brought into line with each other the boxes C' C' carrying the saw-arbors are rendered adjustable in the following manner: The box C' nearest to the saw C is secured to the end of the arm C^2 by a bolt, *d*, screwed into said box and fitted accurately to a hole in the end of the arm C^2, while the box C' farthest from the saw C is secured to the other arm C^2 by a bolt, *d'*, passing through a short slot in said arm, as shown in Fig. 16. Thus a sufficient adjustment of the boxes C' C' can be obtained, with the bolt *d* serving as a pivot or fulcrum.

The box D', which forms a bearing for the forward end of the shaft D, is bolted to the frame B by two bolts, d^2 d^2, passing through slots in said box, as shown in Fig. 19, said box being also provided with a pin, *e'*, set therein, (also shown in Fig. 19 and by dotted lines in Fig. 6,) said pin being fitted accurately to a

hole in the frame B and forming a pivot for the box D′. The box D², near the opposite end of the shaft D, is secured to the frame B by bolts e^2 e^2 also passing through slots in said box, the slots being at right angles to the shaft D and to the slots in the box D′. This arrangement provides for an adjustment of the shaft D to bring the plane of revolution of the saws C C parallel to the edge *a* of the table A, and, together with the device above described for adjusting the boxes C′, obviates the difficulty and necessity of obtaining perfect accuracy in the fitting up of the swing-frame and various bearings connected therewith.

Each of the boxes C′ is provided with an oil-chamber, c^2, into which oil may be introduced through a hole in the side thereof by removing the screw-plug c^3. Holes are bored communicating with the oil-chamber c^2 and with the bearing for the saw-arbor *c*, and into said holes wooden plugs c^4 are driven, through the pores of which the oil passes to lubricate said bearing, all as shown in Figs. 15 and 17.

A′ is a secondary sliding table, adapted to reciprocate in a direction parallel with the edge *a* of the main table, and provided at its front end with a handle, *a′*, which may be grasped by the operator when it is desired to move said sliding table backward or forward.

Upon the top of the table A′ is shown a gage, A², of ordinary construction, adapted for use with the cutting-off saw, or when cutting grooves across the piece to be sawed, said gage being secured upon the table A′ by the two pins a^2 and a^3, and it may be adjusted at various angles with the edge of said table by removing the pin a^2 and swinging the gage about the pin a^3 as a fulcrum, securing it in the desired position by the thumb-screw *b* passing through the slot *b′* in the gage, and screwed into the table A′; or said gage may be removed altogether when using the machine for a different class of work.

The table A′ is formed with three longitudinal ribs, *f f* and *f′*, projecting from its under side in contact with three series of anti-friction rollers, F F and F′, upon which the table rests. Each of the series of rollers F F is mounted upon a bar, F², each roller in the series being mounted upon a stud set in said bar, which bar is made L-shaped in cross-section. The two bars F² F² are secured one upon each side of the intermediate adjustable frame, G, by the bolts f^2 passing through vertical slots in the side of the frame G, as shown in Fig. 8, thus allowing of a vertical adjustment of the bars F², and consequently the rollers F, the adjustment being effected by aid of the set-screws f^3, screwed into ears projecting from the sides of the frame G, their ends bearing against the under side of the bars F².

Each of the rollers F′ is mounted upon a stud, *g′*, secured in an ear projecting from the under side of the bar *g*, said stud passing through a vertical slot in said ear, and being held in position by a shoulder upon one side and a nut upon the other side of the ear, and is thus capable of adjustment in said slot by aid of the set-screw g^2.

The above-described arrangement of mechanism by which the rollers F and F′ are rendered adjustable in a vertical direction is for the purpose of bringing the upper surface of the table A′ to the same height and into the same plane with the upper surface of the main table A, and does away with the necessity of such accurate planing and fitting.

The bar *g* has formed in its upper side a groove, in which the rib *f′* is fitted to slide, and which serves as a guide to the table A′, the bar *g* being secured to the upper side of the frame G by bolts g^3 passing through slots in said bar, as shown in Fig. 5, where the head of the center-bolt is cut away, showing a section of the bolt in the slot, the purpose of said slots being to allow of adjustment of the bar *g* to bring the edge of the table A′ and its line of motion into a position parallel with the saws and the edge *a* of the main table A.

The frame G is made rectangular in form, of a length equal to the width of the frame B, upon which it rests, and may be adjusted or moved laterally, and is provided with cross-ties *h h* and *h′*. The ends of the frame G are fitted to slide upon the upper edges of the frame B, while the central tie, *h′*, rests upon the cross-tie h^2 of the frame B, and has formed upon its under side a tongue, which fits accurately into a groove in the upper edge of the tie h^2, as shown in Fig. 6, and serves to guide the frame G in its lateral motion, said groove being planed at right angles to the edge *a* of the table A. This lateral motion is effected by means of a screw, H, passing through the end of the frame B, into which it is screwed, it being provided at its outer end with a hand-wheel, H′, and engaging at its inner end with the ear *i*, projecting from the side of the cross-tie *h′*, the purpose of adjusting the frame G toward or from the table A being to vary the distance or width of opening between the edge *a* of the table A and the contiguous edge of the table A′ when saws of varying thicknesses are used, and it is also useful in fixing the width of a groove to be cut much more accurately than the same can be done by moving or sliding the work directly by hand.

The frame G is held in any desired position by two bolts, *i′ i′*, one at each end of said frame, each bolt having a square head at its upper end, which comes into contact with the side of the frame G, and is thus prevented from turning, said bolts passing through slots *j j* in said frame, and through holes in the bosses i^2 i^2 cast on the inner side of the frame B, and are provided with hand-nuts *j′ j′*, by tightening which the frame G can be securely fastened to the frame B and prevented from moving thereon. When, however, it is desired to adjust the frame G, the nuts *j′ j′* are loosened and the slots *j j* readily allow of such adjustment.

To the side of one of the bars F² is pivoted a short arm, I, the movable slotted end of

which may be made to engage with a pin, *k*, set in the edge of the table A′, as shown in Fig. 4, for the purpose of locking said table and holding it in a fixed position when it is desired to use it as a stationary table.

Upon the table A is mounted a gage, J, having its lower edge beveled, as shown in Figs. 2, 9, and 13, and pivoted by two bearings, k' k', to a radius-frame, K, which is in turn pivoted upon centers k^2 k^2 set in ears projecting upward from the sliding plate L.

Upon the back of the gage J, near the center of its length, and at its upper edge, is formed a lug or ear, to which is connected the link M, the opposite end of which rests in a slot in the upper end of a short arm, *m*, projecting upward from the frame K between the centers k^2 k^2, the link being secured in said slot by the set-screw m', provided with the handle m^2, by which it may be conveniently operated. The link M thus prevents the gage J from moving about its pivotal connection to the frame K; but by loosening the set-screw m' said gage may be inclined at various angles with the surface of the table A by moving its lower edge toward the saw, and clamped in any desired position by again tightening the set-screw m', said lower edge of the gage being beveled at the back, so that its front face shall extend to the surface of the table A when in an inclined position.

In order that the gage J may be readily fixed in a position perpendicular with the surface of the table A, a set-screw, *n*, is set in the forward end of the plate L, and is so adjusted that when the gage is brought into such perpendicular position its lower edge will strike against the set-screw *n*, thus limiting its further movement in that direction, when it may be secured by the set-screw m'.

For the purpose of adjusting the gage J for sawing different widths of stock the plate L is arranged to slide upon the bed-plate N, a tongue on the under side of the plate L being fitted to a groove, n', in the bed-plate N, thus guiding said plate L in its movements. A bolt, *o*, passes through a slot, o', in the bed-plate N and through a boss on the plate L, and is provided with a large flat head at its lower end in a groove formed in the under side of the plate N, and at its upper end with a hand-nut, P, by which the plate L may be clamped in any desired position upon the bed-plate N.

The plate L is provided with a lug, *p*, projecting from its under side at its forward end, said lug resting upon the table A and forming an additional support for said plate when adjusted to its extreme forward position with the gage J farthest from the bed-plate N. The bed-plate N is held in position upon the table A by two pins, Q and R, fitted to holes in said table, the pin Q having a bearing in the flanged bushing *q*, secured to the bed-plate N by screws q' q' passing through slots in said bushing, as shown in Fig. 11, for the purpose of making the pin Q adjustable toward or from the pin R, so as to obtain the right distance apart of said pins to enable them to enter the holes previously drilled in the table A. The pin R has a bearing in a similar bushing, *r*, secured to the bed-plate N by screws r' and r^2, the screw r^2 passing through a slot in the bushing *r*, as shown in Fig. 1, said slot having a slight curvature with a radius equal to the distance from the center of the slot to the center of the screw r', said screw serving as a pivot or fulcrum about which the bushing *r*, and consequently the pin R, may be adjusted slightly from side to side relative to the bed-plate, or the pin R remaining fixed in the table A. The bed-plate N is thus rendered capable of a slight adjustment about the pin Q as a pivot, the purpose being to bring the face of the gage into a plane parallel with the saws.

Each of the bushings *q* and *r* is made of sufficient length to make a firm bearing for the pin Q or R close to the table A, as indicated in Fig. 11, said bushings projecting into holes in the bed-plate N, the holes being made somewhat larger than the diameter of said bushings to allow for the above-described adjustments.

By removing the pin R the gage J can be swung to various angles with the line of the saws, the pin Q serving as a fulcrum, and held at the desired angle by the thumb-screw S passing through a slot, *s*, in the bed-plate N and screwed into the table A, the purpose of this arrangement being to allow a piece of stock to be fed diagonally across the edge of the saw for cutting a groove elliptical or nearly semicircular in cross-section, it being very useful in making core-boxes and similar work. The size and depth of said groove may be readily varied by adjusting the height to which the saw shall project above the table A, as previously described, and by changing the angular position of the gage J.

When the backward limit to which the plate L may be adjusted upon the bed-plate N is not sufficient for the width of stock to be sawed, the bed-plate N being in the position shown in the drawings, the pins Q and R may be removed, the bed-plate N, together with the gage J, moved backward away from the saw, and the pins Q and R inserted, respectively, in the holes s' and s^2.

A removable plate, T, may be secured against the face of the gage J, and is adapted for use in connection with the sliding table A′ and gage A^2 in cutting off short pieces from the end of a piece of stock to prevent said pieces from catching on the saw or binding or sticking between the saw and the face of the gage J. The gage J with the plate T being adjusted to the proper position, the piece to be sawed is placed upon the sliding table A′ against the face of the gage A^2, with its end bearing against the plate T. The table A′ is then slid forward to bring the piece against the edge of the saw, and the plate T is so located that before the piece is sawed through it will have been removed from contact with said plate, and when cut off can be readily removed from between the saw and the gage J

by the hand of the operator without danger to himself or liability of the piece catching upon or binding against the saw.

The plate T is secured to the gage J by the bolt *t* passing through a slot, *t'*, in the gage and screwed into the back of said plate; and the plate can be readily removed from said gage by sliding said plate upward and passing the head of the bolt *t* through the hole t^2, made of sufficient diameter for that purpose, and communicating with the slot *t'*. The plate T can be as readily placed in position again by inserting the head of the bolt *t* in the hole t^2 and sliding the plate downward, the bolt *t* dropping into the slot *t'*, and the lower edge of the plate resting upon the surface of the table A. The device just described is clearly illustrated in Figs. 3, 12, and 13.

The arm *m*, to which one end of the link M is secured, may be attached to the plate L instead of to the radius-frame K, and adapted for the purpose described without changing the principle of my invention.

I do not claim as new a tilting gage adapted for sawing bevels at various angles, as I am aware that such gage has been made before; neither do I claim anything shown or described in the Letters Patent No. 133,661, granted to E. Moore, December 3, 1872.

I am aware of a patent having been granted, March 10, 1857, to one M. B. Tidey for an improved table-gage for circular sawing machines, and numbered 16,812, but I do not claim anything contained in said patent; but

What I claim as new, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination of the table A', provided with the rib *f'*, fitted to slide in a suitable guiding-groove, one or more anti-friction rollers, arranged in openings in the bottom of said groove and adjustable vertically, substantially as and for the purposes described.

2. In a circular sawing machine, the combination of the sliding table A' and the bars F^2 F^2, made vertically adjustable independent of each other and each carrying a series of anti-friction rollers, substantially as and for the purposes described.

3. In a circular sawing machine, the combination of the movable frame G, adapted to be moved in a direction at right angles to the plane of revolution of the saw, one or more series of anti-friction rollers mounted upon said frame, the table A', supported upon said rollers and adapted to be moved in a direction parallel with the plane of revolution of the saw, and mechanism for moving the frame G and holding it in any desired position, substantially as and for the purposes described.

4. In a circular sawing machine, the combination of the gage J, the adjustable plate L, the radius-frame K, pivoted at two points to both said gage and plate, as set forth, and means of securing said gage in a position perpendicular to the face of the table or at any desired angle thereto, substantially as described.

5. In a circular sawing machine, the combination of the gage J, the adjustable plate L, the radius-frame K, pivoted at two points to both said gage and plate, as set forth, the upwardly-projecting arm *m*, the link M, pivoted at one end to said gage, and mechanism for securing the opposite end of said link to the arm *m* as a means of adjusting the face of the gage to various angles to the face of the table A, for the purposes specified.

6. In a circular sawing machine, the combination of the gage J, the adjustable plate L, the set-screw *n*, fixed in the end of said plate, the radius frame K, pivoted to said gage and plate, as set forth, the upwardly-projecting arm *m*, the link M, pivoted at one end to said gage, and mechanism for securing the opposite end of said link to the arm *m* as a means of adjusting the face of the gage to a position perpendicular to the face of the table A and to various angles thereto, as and for the purpose described.

7. As a means of adjusting the gage J to a position parallel longitudinally with the plane of revolution of the saw, the bed-plate N, connected to said gage, the adjustable bushings *q* and *r*, set in said bed-plate, the pins Q and R, and the table A, provided with holes to receive said pins, all arranged and adapted to operate substantially as and for the purposes described.

8. In combination with the gage J, having its lower-edge beveled, as shown, the radius-frame K, the plate L, and means of adjusting said gage to and securing it in a perpendicular or inclined position, the bed-plate N, pivoted to the table by the pin Q, and provided with the curved slot *s*, to receive the thumb-screw S, and adjustably attached to the plate L, all arranged and adapted to operate substantially as and for the purposes described.

9. The bed-plate N, provided with the groove *n'*, pins Q and R, and adjustable bushings *q* and *r*, in combination with the sliding plate L, the gage J, and means of connecting said gage to the plate L, all arranged and adapted to operate substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 6th day of April, A. D. 1881.

HENRY J. COLBURN.

Witnesses:
E. A. HEMMENWAY,
WALTER E. LOMBARD.