(No Model.) 5 Sheets—Sheet 1.

C. GLADE.

CIRCULAR SAWING MACHINE.

No. 365,512. Patented June 28, 1887.

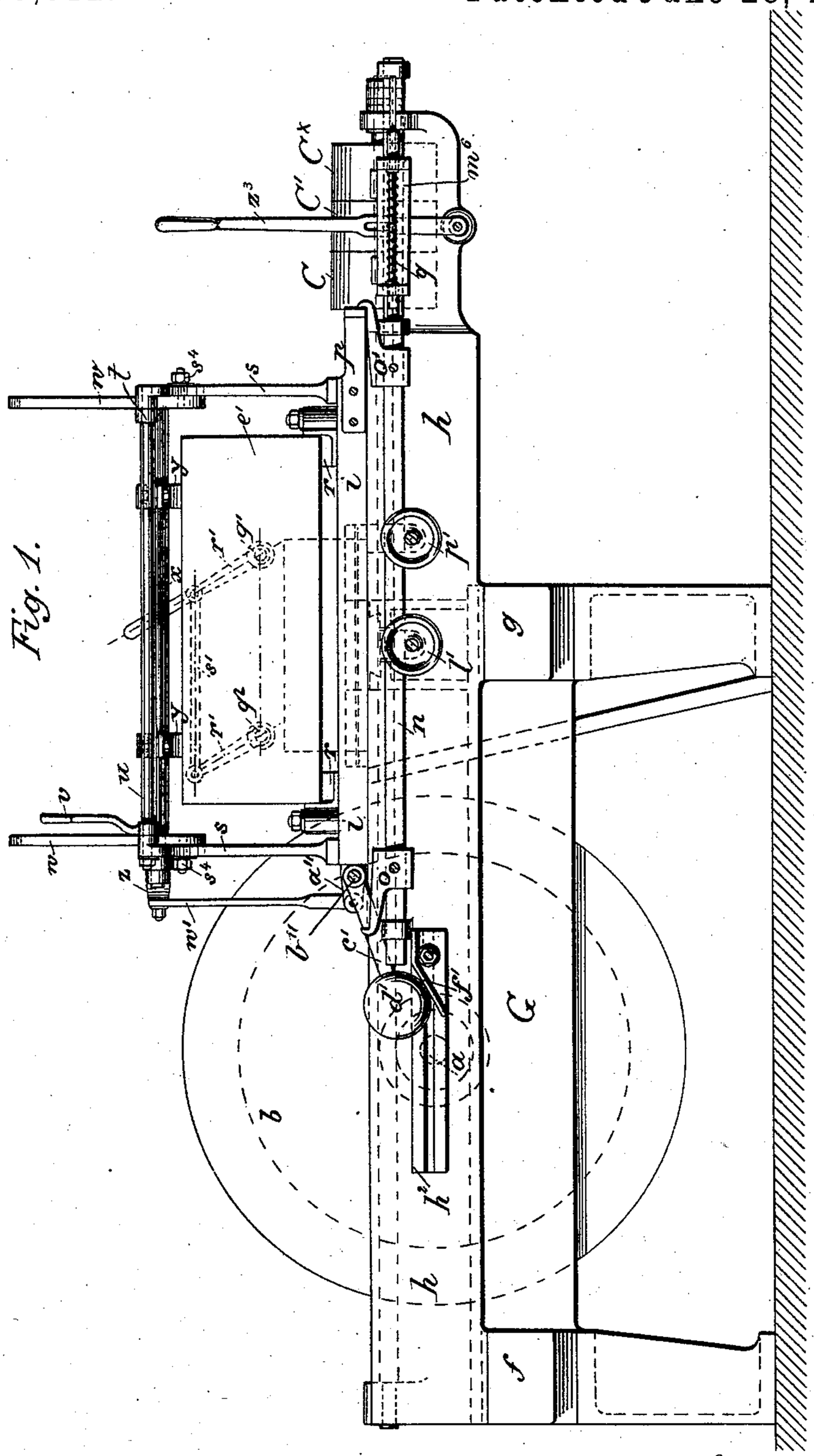

Fig. 1.

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(No Model.) 5 Sheets—Sheet 2.

C. GLADE.

CIRCULAR SAWING MACHINE.

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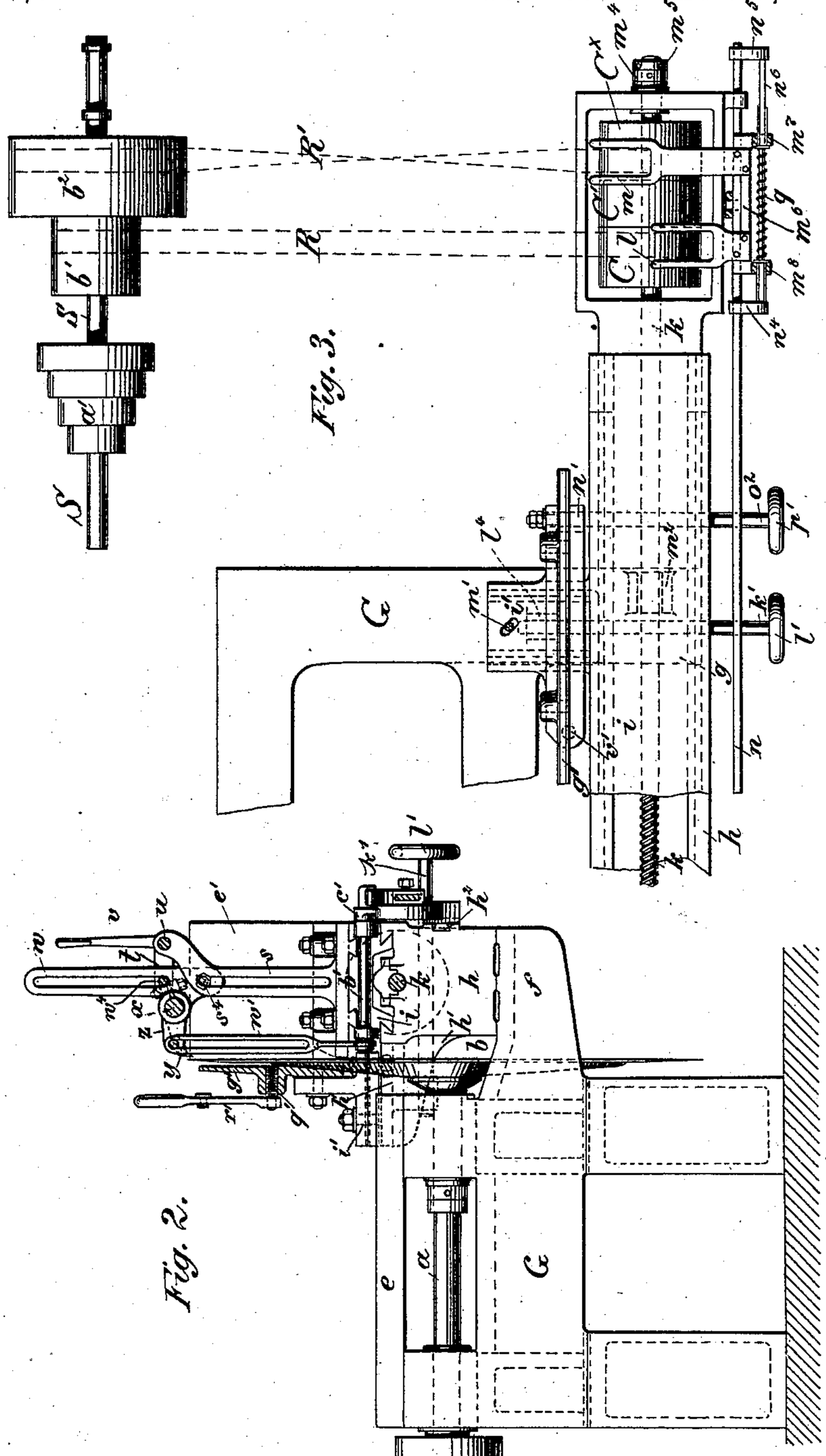

Fig. 3.

Fig. 2.

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(No Model.) 5 Sheets—Sheet 3.

C. GLADE.

CIRCULAR SAWING MACHINE.

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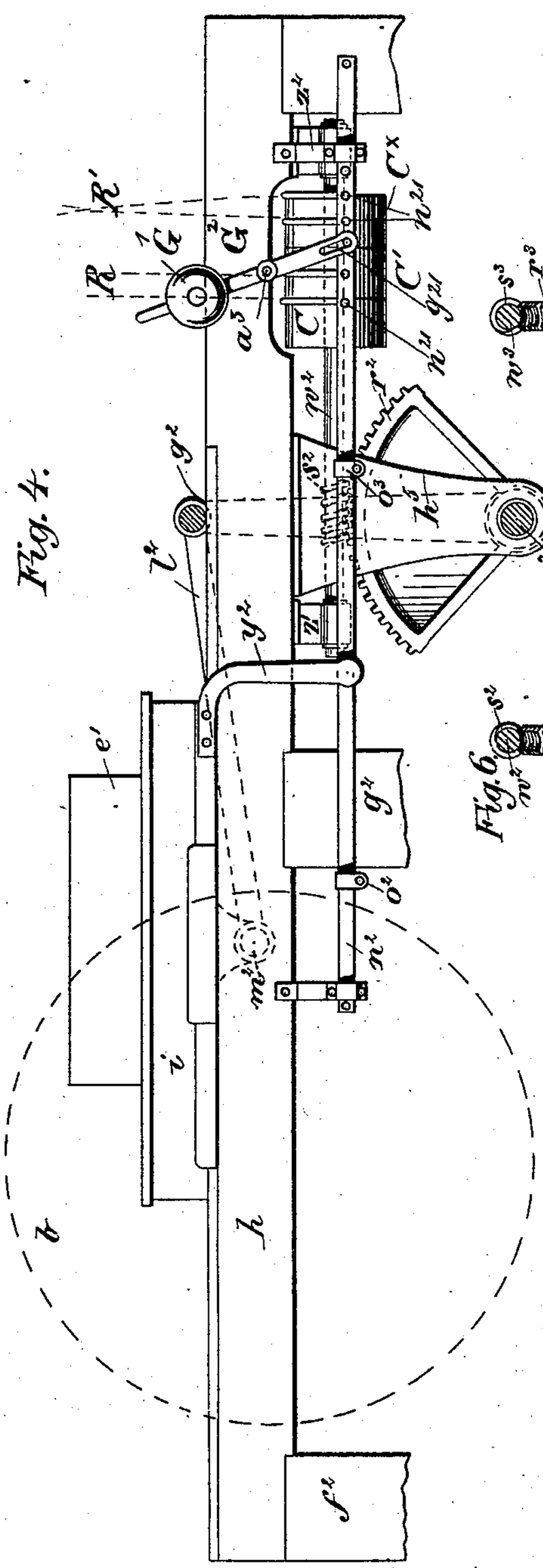

Fig. 4.

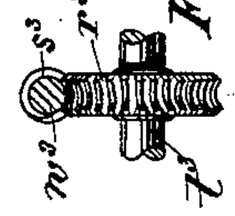

Fig. 6.

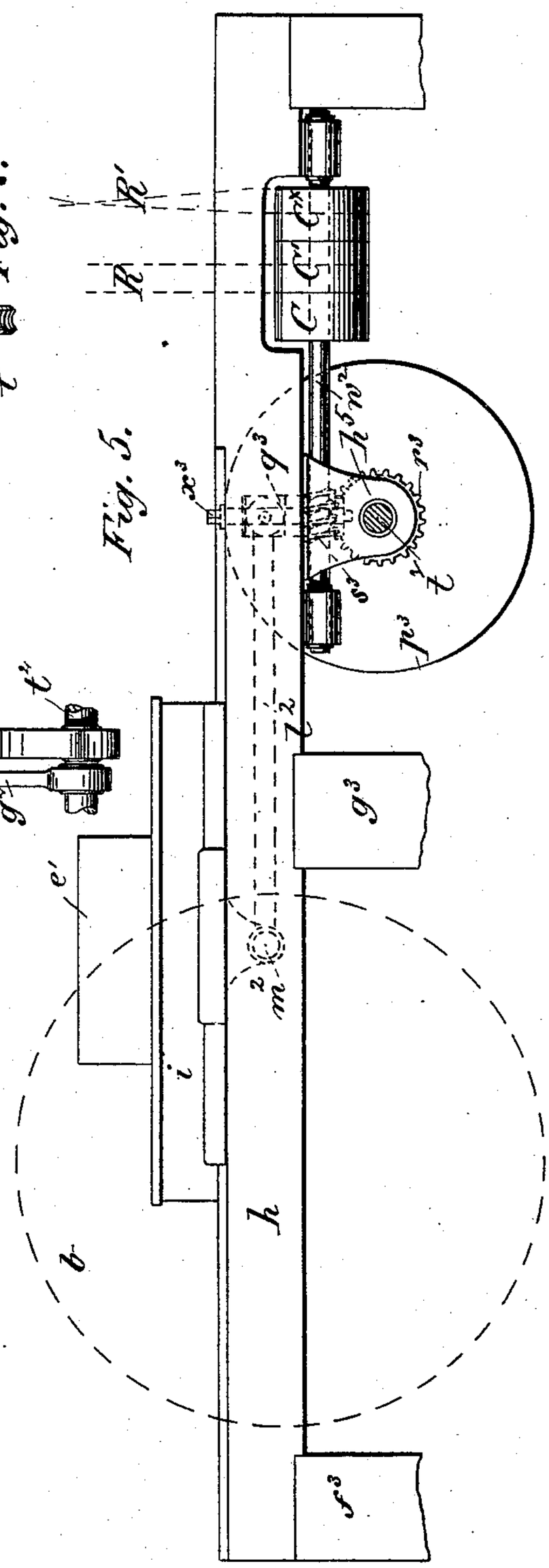

Fig. 5.

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(No Model.) 5 Sheets—Sheet 4.

C. GLADE.

CIRCULAR SAWING MACHINE.

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Fig. 8.

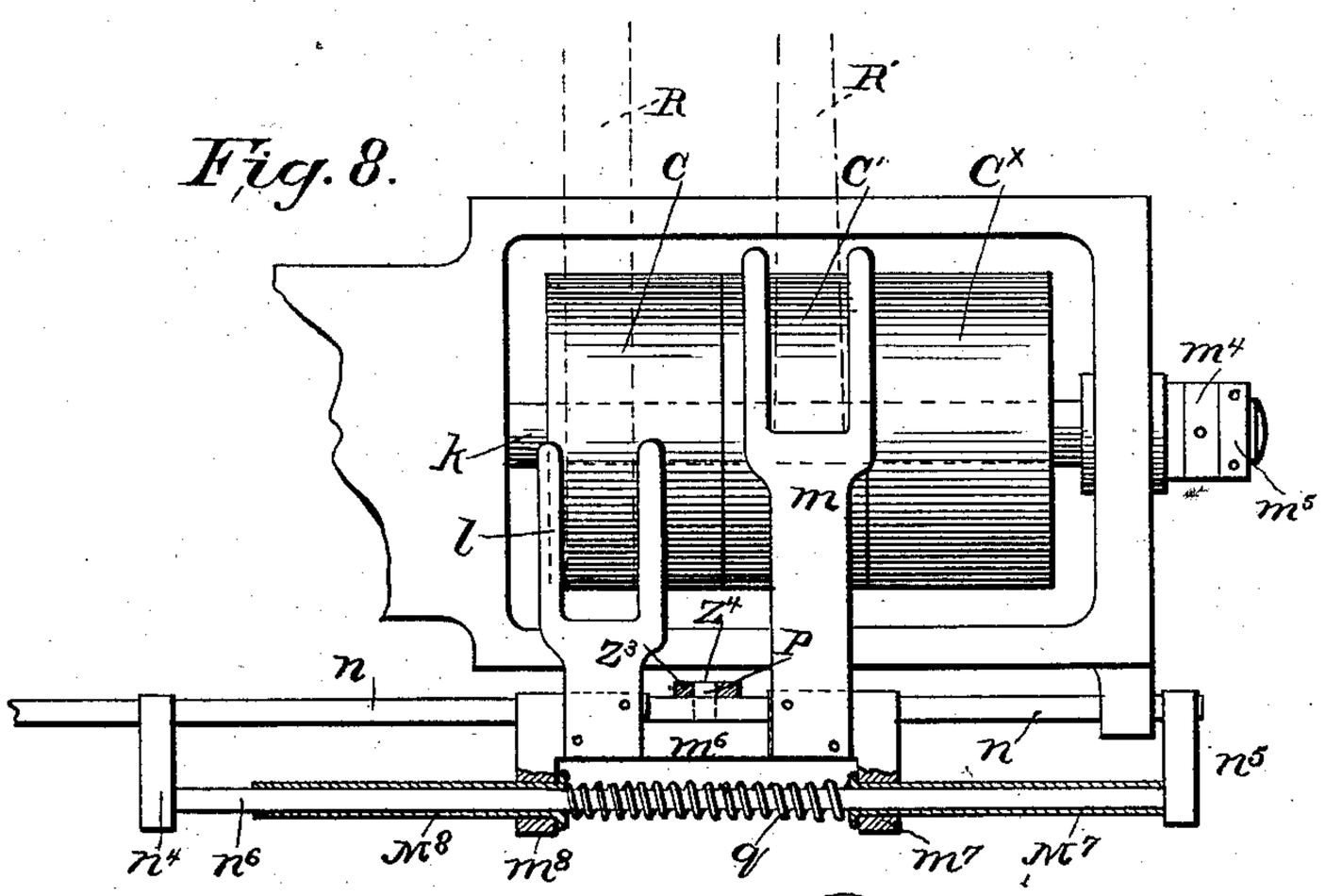
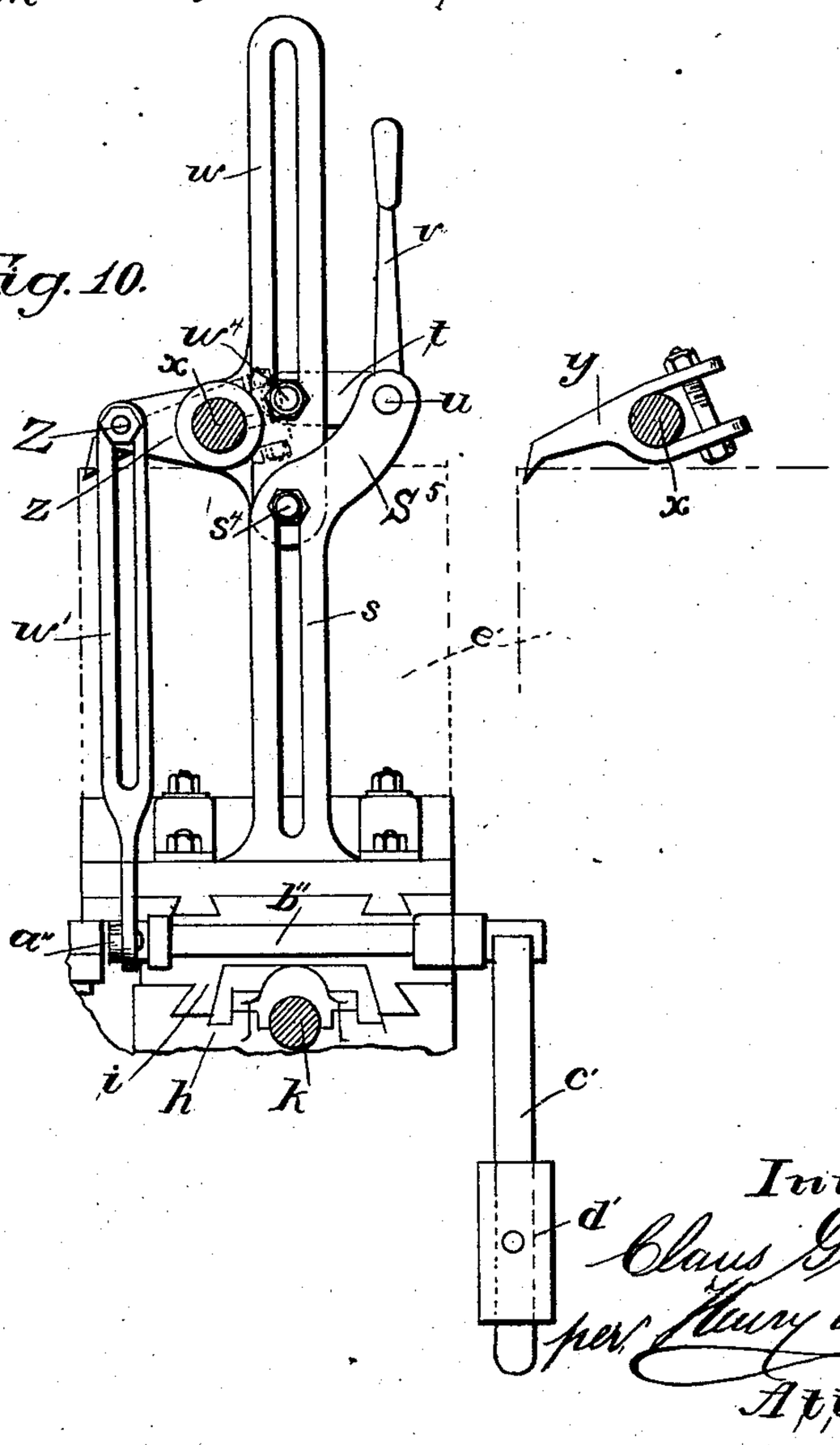


Fig. 10.



Witnesses.
Wm. R. Davis
H. E. Poulter.

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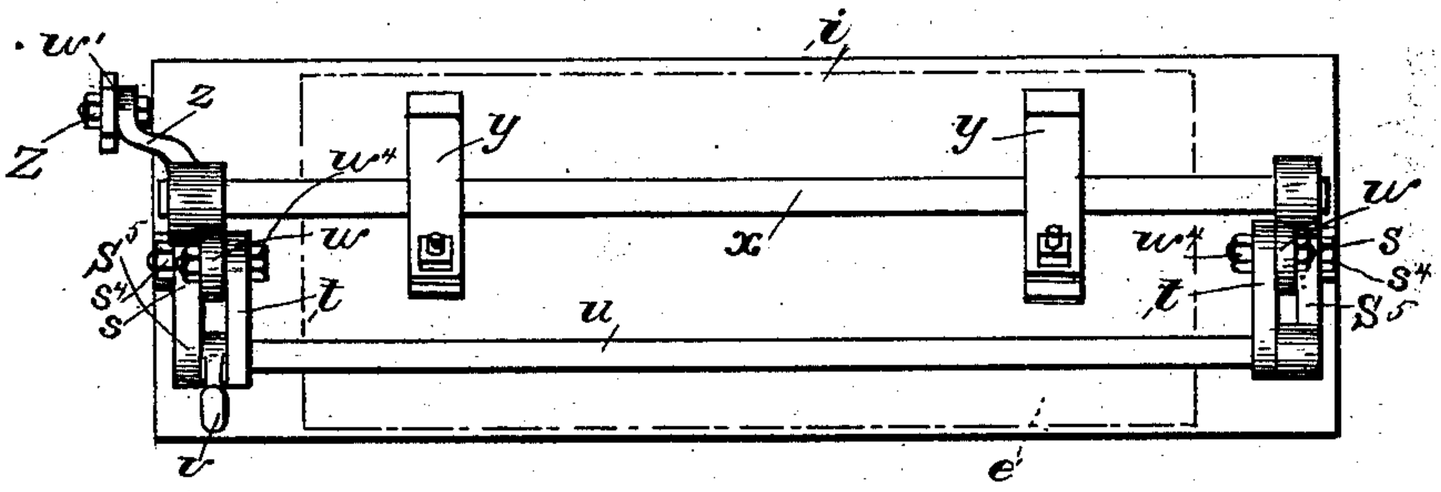
(No Model.) 5 Sheets—Sheet 5.

C. GLADE.

CIRCULAR SAWING MACHINE.

No. 365,512. Patented June 28, 1887.

Fig. 9.



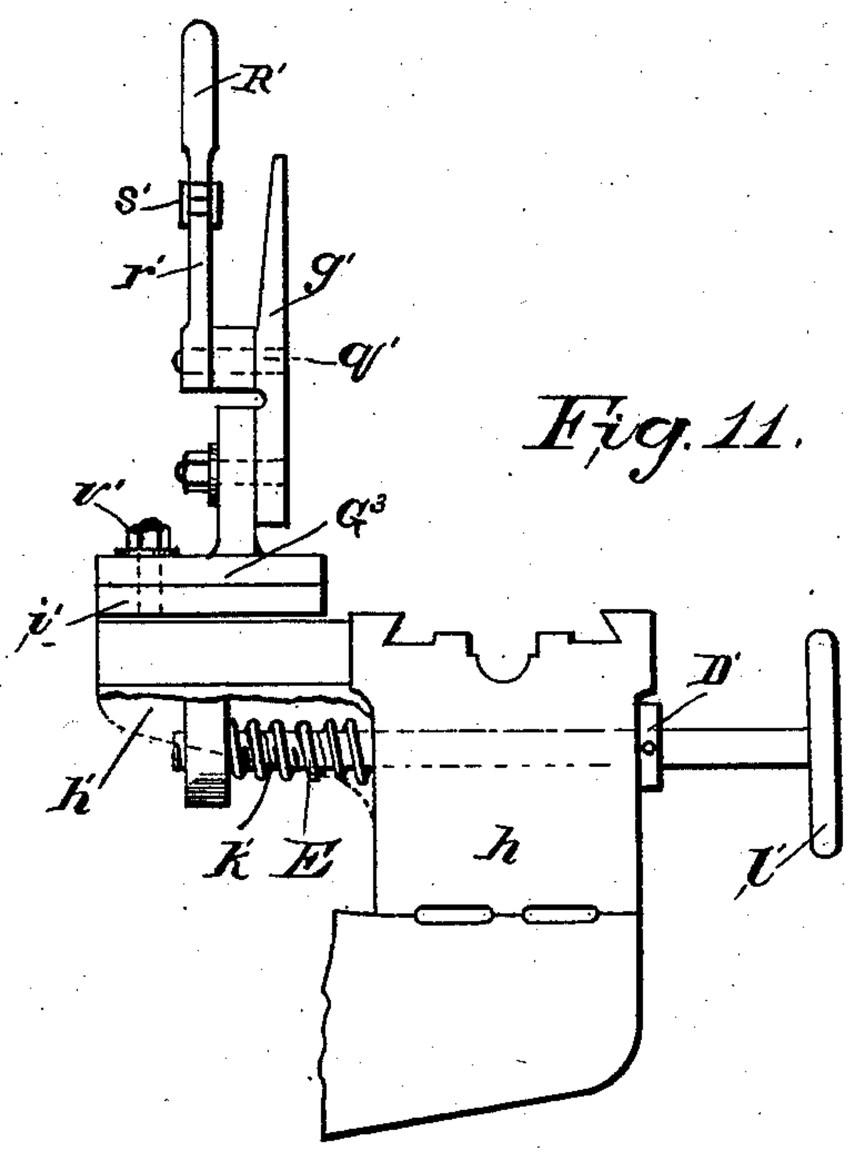


Fig. 11.

Witnesses.
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UNITED STATES PATENT OFFICE.

CLAUS GLADE, OF DREYE, NEAR BREMEN, PRUSSIA, GERMANY.

CIRCULAR SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 365,512, dated June 28, 1887.

Application filed February 17, 1886. Serial No. 192,250. (No model.) Patented in Germany October 25, 1883, No. 27,439, July 1, 1884, No. 29,817, and March 22, 1885, No. 32,725.

To all whom it may concern:

Be it known that I, CLAUS GLADE, a subject of the King of Prussia, residing at Dreye, near Bremen, have invented certain new and useful Improvements in Sawing-Machines, (for which Letters Patent have been granted in Germany under dates of October 25, 1883, No. 27,439, July 1, 1884, No. 29,817, and March 22, 1885, No. 32,725;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of wood-working machines more particularly designed for cutting thin boards, such as are usually employed in the manufacture of cigar and other like light boxes.

The invention has for its object certain improvements in the construction of the class of machines referred to; and it consists in the construction, arrangement, and co-operation of parts, substantially as hereinafter described, and as set forth in the claims.

Referring to the annexed drawings, in which like letters of reference indicate like parts, Figure 1 is a side elevation, Fig. 2 a left end elevation, partly in section, and Fig. 3 a partial top plan view, of a machine embodying my invention. Figs. 4 and 5 are partial elevations of the machine, showing modified arrangements of mechanism for automatically reversing the traversing motion of the carriage. Figs. 6 and 7 are detail views thereof. Fig. 8 is a detached detail sectional plan view of the belt-shifting devices drawn to an enlarged scale. Fig. 9 is a detached top plan view of the blocking devices on an enlarged scale. Fig. 10 is a like end elevation thereof. Fig. 11 is a detail elevation of a portion of the frame, showing a portion of the means for adjusting the gage-plate g'.

In the above drawings, G indicates the main frame, provided with suitable bearings for the arbor a of a circular saw, b, upon which arbor are mounted a fast and a loose belt-pulley, c and d, respectively, as shown in Fig. 2. The top or table e of the frame G is slotted or interrupted at a point immediately above the arbor a, so as to afford access to the bearings of the latter. When the machine is in operation, this opening or slot is covered by a sheet-metal plate to prevent access of sawdust to the said bearings of the saw-arbor. The frame G has two lateral brackets, f and g, one at each end thereof, to which is secured a cheek-piece or rail, h, that is provided on its upper face with a dovetailed groove, in which is fitted a correspondingly-shaped rail formed on the under side of a carriage, i, that has a traversing motion over the said rail h.

The traversing movement is imparted to the carriage by means of a screw, k, that passes centrally along the under side of said carriage and works in a nut, m^2, formed on or secured to said under side of carriage i, as shown in dotted lines in Fig. 3. The screw k has its bearings in the opposite ends of the rail h, and is held against longitudinal movement by a nut, m^4, and a check-nut, m^5, as shown in Fig. 3.

It is obvious that if the screw k is rotated in the proper direction the carriage i will be moved toward the saw b, and that if this rotation of the screw is reversed the said carriage will be moved in a reverse direction, or away from the said saw.

It is also obvious that if the carriage is moved at a proper speed to feed the wood to the saw, and at a greater speed when said carriage moves away from said saw, a material saving in time is thereby effected. To this end I have devised means not only for imparting to the carriage a greater speed in a direction away from the saw than that toward the saw, but also means whereby the reversal of the traversing motion is effected automatically, as follows:

On the outer end of the screw k is mounted a fast pulley, C', and on opposite sides thereof a loose pulley, C and C^x.

A shaft, S, carries two driving-pulleys, b' b^2, the latter pulley having a diameter twice as great as the diameter of the pulley b'; and R and R' are the two driving-belts, the former belt being a straight belt, while the belt R' is a crossed belt.

The carriage i receives its traversing motion to the saw through the pulley b' and belt R, and from the saw through the pulley b^2 and

belt R′, so that the motion of the carriage *i* in a direction away from the saw is twice as great as that toward said saw.

The belts R and R′ may be automatically shifted from either of the loose pulleys C or C^x onto the fast pulley C′ between them, to effect the reversal of the traversing motion of the carriage by mechanism which may be arranged and constructed in any suitable manner.

In Figs. 1 and 2 I have shown one convenient arrangement of such mechanism, which is constructed and arranged for operation as follows:

m^6 is a slide-bar having at opposite ends a bracket-bearing, m^7 m^8, respectively, through which the shifting bar or rod *n* passes loosely.

To the bar m^6 are secured the belt-shifting forks *l* and *m*, and on said bar is secured a pin, P, Figs. 2 and S, that projects into a vertical slot, z^4, formed in a shifting-lever, z^3, fulcrumed to the main frame, as shown in Fig. 1, by means of which lever the belts R and R′ may be shifted from the fast pulley C′ onto the loose pulleys C C^x, to disconnect the driving-screw *k* from the driving-shaft.

In the outer ends of the bracket bearings or arms m^7 and m^8 are formed bearings in which are loosely mounted flanged sleeves M^7 and M^8, respectively, so arranged that the flanges thereof will abut or bear against the inner face of the bracket-arms, as more plainly shown in Figs. 3 and S.

Through the sleeves M^7 and M^8 passes a rod, n^6, that is secured to bracket-arms n^4 and n^5, rigidly connected with the belt-shifting bar *n*, and on said rod between the flanges of the sleeves M^7 M^8 is mounted a coiled spring, *q*.

Near the opposite ends of the belt-shifting rod *n*, which slides in suitable bearings formed on or secured to the main frame, are mounted lugs *o* and *o′*, that lie in the path of an arm or lug, *p*, secured to the carriage *i*, said lugs *o* and *o′* being adjustable on the rod *n*, so as to provide means for adjusting the amplitude of the traversing motion of said carriage *i*.

The operation of the belt-shifting devices may be briefly described to be as follows: As the carriage *i* is about to reach the limit of its traversing motion toward the left or in the direction of the saw, the arm *p* will engage with the lug *o*, thereby drawing the rod *n* in the same direction. During this motion of the rod *n* its arm n^5 will come in contact with the end of sleeve M^7, while the bracket-arm n^4 will move away from the end of sleeve M^8, Figs. 3 and S, the spring *q* being compressed between the flanges of the sleeves. The pressure of the spring exerted upon sleeve M^8 will move the latter, the slide-bar m^6, and the belt-shifting forks *l* and *m* in the same direction, the belt R′ being moved from loose pulley C^x onto fast pulley C′, while belt R is moved from fast pulley C′ onto the left-hand loose pulley C, this operation being reversed when the arm *p* engages the lug *o′* on the right end of carriage *i*.

Upon the carriage are arranged supports *r* for the block of wood to be cut. These supports are interchangeable to support blocks of wood of different sizes in such a position that the cutting is always effected at the highest possible point of the circular saw.

The supports or bearings for the block *e′* are secured in position by means of bolts and nuts, which bolts pass through suitable slots in the carriage *i*.

The block *e′* is secured to its supports by means of the following devices: At opposite ends of the table is secured a slotted standard, *s*, from the upper end of which projects an arm, S^5, in which a shaft, *u*, has its bearings.

To the shaft *u*, near each end, is secured a lever or link, *t*, provided with a screw-threaded pin or bolt, w^4, that passes through the vertical slot of a support, *w*, that is provided with a screw-threaded pin or bolt, s^4, that projects into the vertical slot of the standard *s*, said pins w^4 s^4 being secured in position on the supports and standards by means of nuts, as more plainly shown in Fig. 10.

In the slotted supports *w* are formed bearings for a shaft, *x*, on which are secured adjustably the blocking-dogs *y*, by means of which the block of wood to be sawed is secured to the carriage *i*.

It will be observed that by means of the construction and arrangement of the devices above described the blocking devices may be adjusted vertically within the limit of the slots of the standards *s* and supports *w* by loosening the nuts on the pins w^4 s^4 and raising or lowering the supports *w* and shaft *x* on the standards *s*, and by means of the hand-lever *v*, secured to shaft *u*, the supports *w* and shaft *x* may be tilted by hand to disengage the dogs *y* from the block of wood, the shaft *u* having a fixed bearing in the arms S^5 of standards *s*, and the pin s^4 serving as a fulcrum for the support *w*.

To save the labor of disengaging the block of wood from the blocking-dogs *y y* by hand every time a board has been sawed off, I have devised means whereby this may be effected automatically.

At its left end the shaft *x* carries a radial arm, *z*, to which is secured a screw-threaded pin, Z, that projects into a vertical slot of a link, *w′*, to which it is pivotally connected by a nut or nuts. The lower end of the link *w′* is pivoted to a radial arm, *a″*, secured to a cross-shaft, *b″*, that has its bearings at the left end of the carriage *i*.

To a rock-lever, *c′*, on the outer end of shaft *b″* is adjustably secured a weight, *d′*, through which the shaft *b″* is held in such a position that the blocking-dog *y* will be held in engagement with the block of wood *e′*, as will be readily understood.

In the side of the rail or cheek-piece *h* of the frame is formed a slotted guideway, h^2, in which is adjustably secured a slide that has an inclined projecting ledge, *f′*, which lies in the path of the weight *d′*. As the carriage moves toward the saw, away from the ledge

or projection f', the dogs $y\ y$ remain in engagement with the block of wood e' and hold the same firmly on the carriage. When the traversing motion of the latter is reversed, after a board has been sawed off, the weight d' rides up the incline f', thereby rocking the shaft b'' from left to right. This lifts the link w', and through the latter the shaft x is rocked to lift the dogs $y\ y$ out of engagement with the block of wood e'. As the weight d' reaches the highest point of the incline the carriage i has also reached the limit of its reverse traversing motion, when the block of wood may be adjusted relatively to the saw, as hereinafter described, to cut another board. As the carriage i again moves toward the saw, the weight d' slides down the incline f', and before the block of wood comes in contact with the saw said block will again be firmly held to the carriage by the blocking-dogs.

The lateral adjustment of the block of wood—*i. e.*, the adjustment of the block of wood toward the saw—is effected by means of a gage-plate, g', and screw k', as follows: The gage-plate g' is secured to a T-shaped foot-piece or support, G^3, that is pivoted at one end, as shown at v', to a carriage, i', that slides in a dovetailed guideway, h', Fig. 2, formed in the frame of the machine. The carriage has an interiorly-screw-threaded lug, l^4, in which operates the adjusting-screw k', that carries a hand-wheel, l', said screw k' being held against endwise movement in said lug l^4, and a collar, D', hereinafter referred to, which collar bears on the outer face of the cheek-piece or rail h of the frame.

To the carriage i' is secured a threaded bolt or pin, m', that projects through a segmental slot, M', formed in the support G^3 of the gage-plate g', said slot being a segment of a circle drawn from the pivot v' as a center.

It will be seen that by means of the screw k' and hand-wheel l' the carriage and gage-plate may be adjusted in a plane at right angles to the plane of motion of the saw. When, however, an undressed block, or block having an uneven surface, is to be operated on, it is necessary to square it first, and to effect this means should be provided to adjust or set the block at any desired angle to the direction of motion of the saw. To this end I pivot the gage-plate g' at one end to the carriage, as described, and adjust the same to position by means of an adjusting-screw, o^2, and hand-wheel p' thereon. The screw o^2 works in a threaded bracket, n', formed on the foot-piece G^3 at the end opposite to the pivot v', said screw being held against endwise motion by means of a nut and check-nut in suitable bearings formed in the frame of the machine, the gage-plate being guided in this movement by the pin m', projecting through the slot M', formed in the support or foot-piece G^3 of said gage-plate, as above set forth.

It will be observed that by means of the described devices the carriage i', the plate g', and its support G^3 are adjustable together in one direction, and the support G^3 and its plate g' are adjustable independently of the carriage i' on the pivot v'.

In addition to the arrangement for setting the gage-plate at an angle to the direction of motion of the saw in dressing or squaring a block of wood, I also provide means whereby a block of wood having an uneven surface may be squared by first cutting off a slab therefrom. This I accomplish by means of screws $q'\ q^2$, having a thread of great pitch, said screws working in threaded bosses formed on the gage-plate g'. One of these screws is connected by a radial arm, r', to a link, s', which link is pivoted to a lever, R', mounted on the screw q^2. The arrangement is such that when the lever is moved in one direction the end of the screws will project to a certain extent from the face-plate g', and when said lever is rotated in a reverse direction the said end of the screws will be withdrawn in the bosses. This arrangement is shown in Fig. 2 and in dotted lines in Fig. 1.

In order to more securely hold the gage-plate g' in the position to which it has been adjusted, the screw k' carries an adjustable collar, D', that bears on the outer face of the cheek-piece h, and on said screw is mounted a spring, E, that bears upon the nut or lug on the carriage i', in which the screw operates, and on the inner face of the said cheek-piece, thus holding the carriage i' more securely in the position to which it has been adjusted, as shown in Fig. 11.

In the modified arrangement and construction of mechanism shown in Figs. 4 and 6 the carriage i is connected by means of a rod, l^2, to the end of a lever, g^2, secured to a shaft, t^2, to which is also secured a toothed sector, r^2, that gears with a worm, s^2, on a shaft, w^2, supported in brackets z' on the under side of the cheek-piece or rail h, and which shaft carries the belt-pulleys C, C', and C^x.

The reversal of the traversing motion is effected by means of an angle arm, y^2, secured to the carriage i and projecting into the path of two tappets, $o^2\ o^3$, secured to a slide-rod, n^2, said tappets being adjustable on the rod to regulate the amplitude of the traversing motion of the carriage.

G^2 is a lever pivoted at a^3 to the rail h, and carrying at one end an adjustable weight, G'. The other end of the lever is slotted, as at g^{21}, and said slot engages one of a series of pins, n^{21}, on the rod n^2 as soon as the arm y^2 engages one of the tappets $o^2\ o^3$. The rod n^2 is carried along, thus moving the lever on its fulcrum, until the position thereof is reversed as the lever moves from a vertical to one or the other side on its fulcrum. The rod n^2 is carried along very rapidly under the impulse of the weight G', thus shifting the belt-forks, which are secured to rod n^2 from one of the fast pulleys C or C^x to the loose pulley C', carrying the belts R and R' along, and thus reversing the motion of the carriage i.

In the modifications shown in Figs. 5 and 7

the connecting-rod l^2 is, as also shown in Fig. 4, pivoted at one end to a bracket, m^3, depending from the under side of carriage i, and at the other end to a disk, p^3. The connection between the rod l^2 and the disk is such that the amplitude of the throw of said rod may be varied within certain limits, and to this end the disk p^3 has a radial slot, in which is fitted a block, q^3, that is adjustable within said slot by means of a set-screw, x^3, and said block carries the wrist-pin, to which one end of rod l^2 is connected. The shaft w^2 here also carries a worm, s^2, that meshes with a wheel, r^3, on the shaft t^2, on which is also secured the disk p^3.

The mechanism shown in Figs. 1 and 3, or that shown in Fig. 4, may here be employed for reversing the traversing motion of the carriage i.

Instead of connecting the rod l^2 with the disk p^3 it may be directly connected to an adjustable wrist-pin on the toothed wheel meshing with the worm s^2, or with one of a set of differential gearing, whereby a slow motion in one direction and a more rapid motion in a reverse direction may be imparted to the carriage i.

Having described my invention, what I claim is—

1. In a wood-working machine, the combination, substantially as described, with the traversing carriage i and two rock-shafts connected to rock or oscillate together, one of said shafts carrying the dogs for securing the wood to be worked to the carriage, and the other shaft a rock-lever, of a fixed stop in the path of the rock-lever to rock the same when the carriage reaches a given point in its traversing movement in one direction and to rock the shafts and disengage the dogs from the wood on the carriage, for the purposes specified.

2. In a wood-working machine, the combination, substantially as described, with the traversing carriage i, two rock-shafts connected to rock or oscillate together, dogs for securing the wood to be worked, mounted on one of said shafts, and a weighted rock-lever mounted on the other shaft, of a stop adjustable in the path of the rock-lever for rocking the same when the carriage reaches a given point in its traversing movement, for the purposes specified.

3. In a wood-working machine, the combination, substantially as described, with the traversing carriage i, two superposed rock-shafts connected to rock or oscillate together, one of said shafts being adjustable toward and from the other, dogs for securing the wood to the carriage, mounted on the upper shaft, and a rock-lever mounted on the lower shaft, of a fixed stop in the path of the rock-lever to rock the same and the shafts when the carriage reaches a given point in its traversing motion, substantially as and for the purposes specified.

4. In a wood-working machine, the combination, substantially as described, with the traversing carriage i, two superposed rock-shafts connected to rock or oscillate together, dogs for securing the wood to the carriage, mounted on the upper shaft, and a rock-lever mounted on the lower shaft, of a fixed stop in the path of the traversing carriage to rock the lever when said carriage reaches a given point in its traversing motion, and a gage-plate arranged on one side of the carriage and adjustable in a direction at right angles to the traversing motion thereof, for the purposes specified.

5. In a wood-working machine, the combination, substantially as described, with the traversing carriage i, two superposed rock-shafts connected to rock or oscillate together, dogs for securing the wood to the carriage, mounted on the upper rock-shaft, and a rock-lever mounted on the lower rock-shaft, of a fixed stop in the path of the rock-lever to rock the same and the shafts when the carriage reaches a given point in its traversing motion, a gage-plate arranged on one side of the carriage and adjustable in an arc of a circle on a fixed pivot, and an adjusting-screw for adjusting the gage-plate in a direction at right angles to the motion of said carriage, for the purpose specified.

6. The combination, with the carriage i and the vertically-slotted standards s, the shaft u, mounted in said standards, and the radial arms or levers t on shaft u, said levers having pins w^4, of the vertically-slotted supports w, provided with pins s^4, adjustable on standards s by means of said pins s^4, projecting into the slots of the standards, and the pins w^4 on the radial arms or levers t, projecting into the slots of the supports w, and the shaft x, carrying dogs y, mounted in supports w, said parts being constructed and operating substantially as and for the purpose specified.

7. The combination, with the carriage i and the vertically-adjustable mechanism for securing the wood to said carriage, consisting of the standards s, shaft u, mounted thereon, radial arms or levers t, the support w, and shaft x, mounted thereon and provided with a radial arm or lever, z, of the vertically-slotted connecting rod or link w', the shaft b'', connected with the arm z through said slotted link w, and the weighted lever c' on shaft b'', said parts being constructed and operating substantially as and for the purposes specified.

8. The combination, with the traversing carriage i, of the adjustable carriage i', arranged at right angles to carriage i, the gage-plate g', its support G^3 pivoted at one end to said carriage i', and the adjusting-screws k' o^2, operating on carriage i' and support G^3, substantially as described, for the purposes specified.

9. In a wood-working machine, the combination, with the saw, the carriage i, having a projecting lug or arm, p, at one end, two superposed rock-shafts mounted on said carriage and connected to rock together, dogs on the upper shaft for securing the wood to the carriage, a rock-lever on the lower shaft of the inclined plane f', adjustable lengthwise of and

operating on the rock-lever to rock the shafts when the carriage reaches a given point in its traversing motion, and a belt-shifter operated by the carriage to reverse the traversing motion thereof, substantially as and for the purposes specified.

10. In a wood-working machine, the combination, with the revolving saw *b* and the traversing carriage *i*, provided with a lug or arm, *p*, at each end, of the belt-shifting devices, comprising the fixed rod *n*, the shifter-bar m^6, movable endwise thereon and having bracket-arms m^7 m^8, the sleeves M^7 M^8, loosely mounted in said bracket arms, the rod n^6, passing loosely through said sleeves and connected rigidly with the rod *n*, and the spring *q*, mounted on said rod and bearing on the ends of the sleeves, said parts being constructed and operating substantially as described, for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

CLAUS GLADE.

Witnesses:

J. W. BECHTOLD,

A. G. BORCHERS.