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# T. S. CRANE.

## WOOD CUTTING MACHINE.

No. 379,451. Patented Mar. 13, 1888.

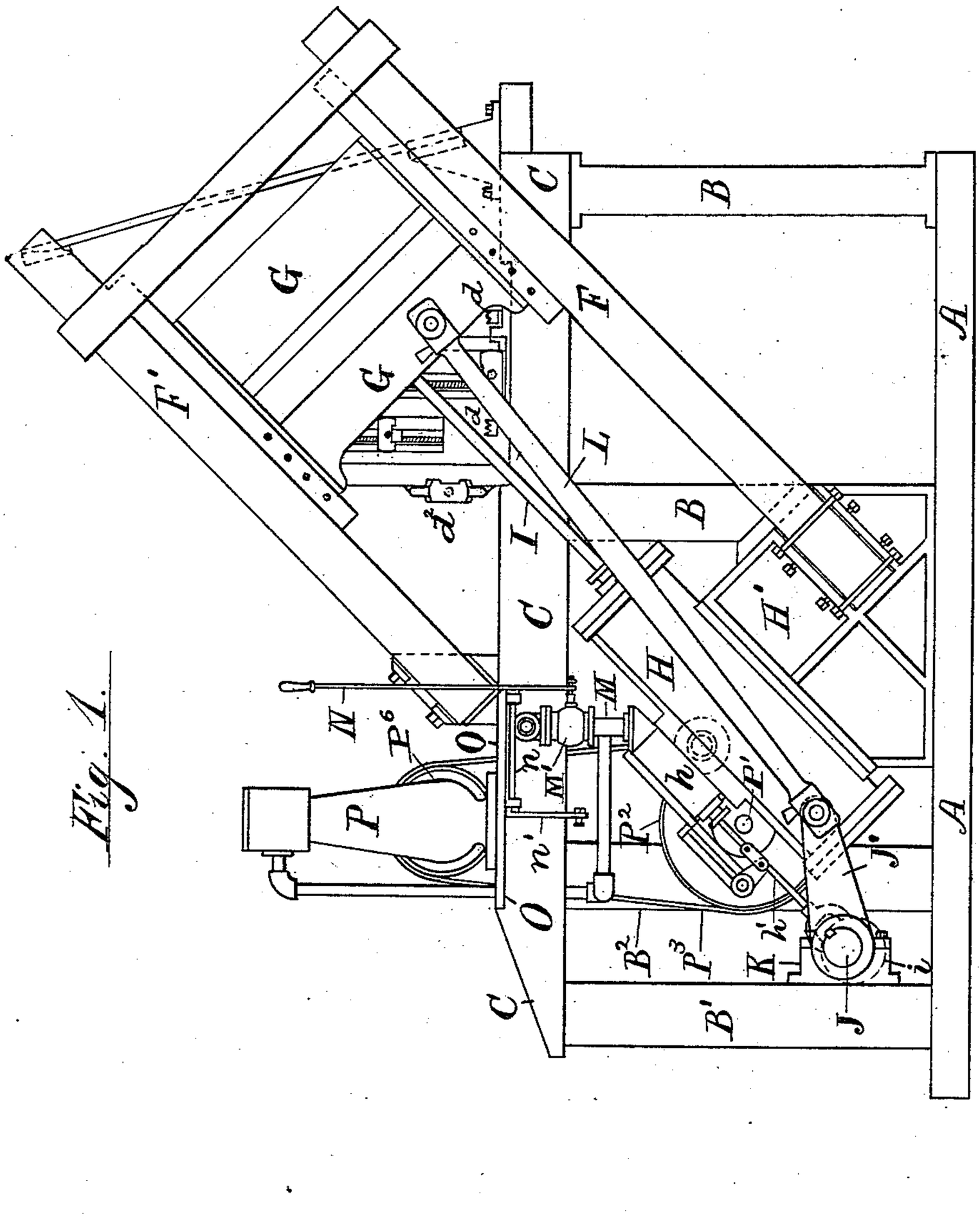


Fig. 1.

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## WOOD CUTTING MACHINE.

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Fig. 2.

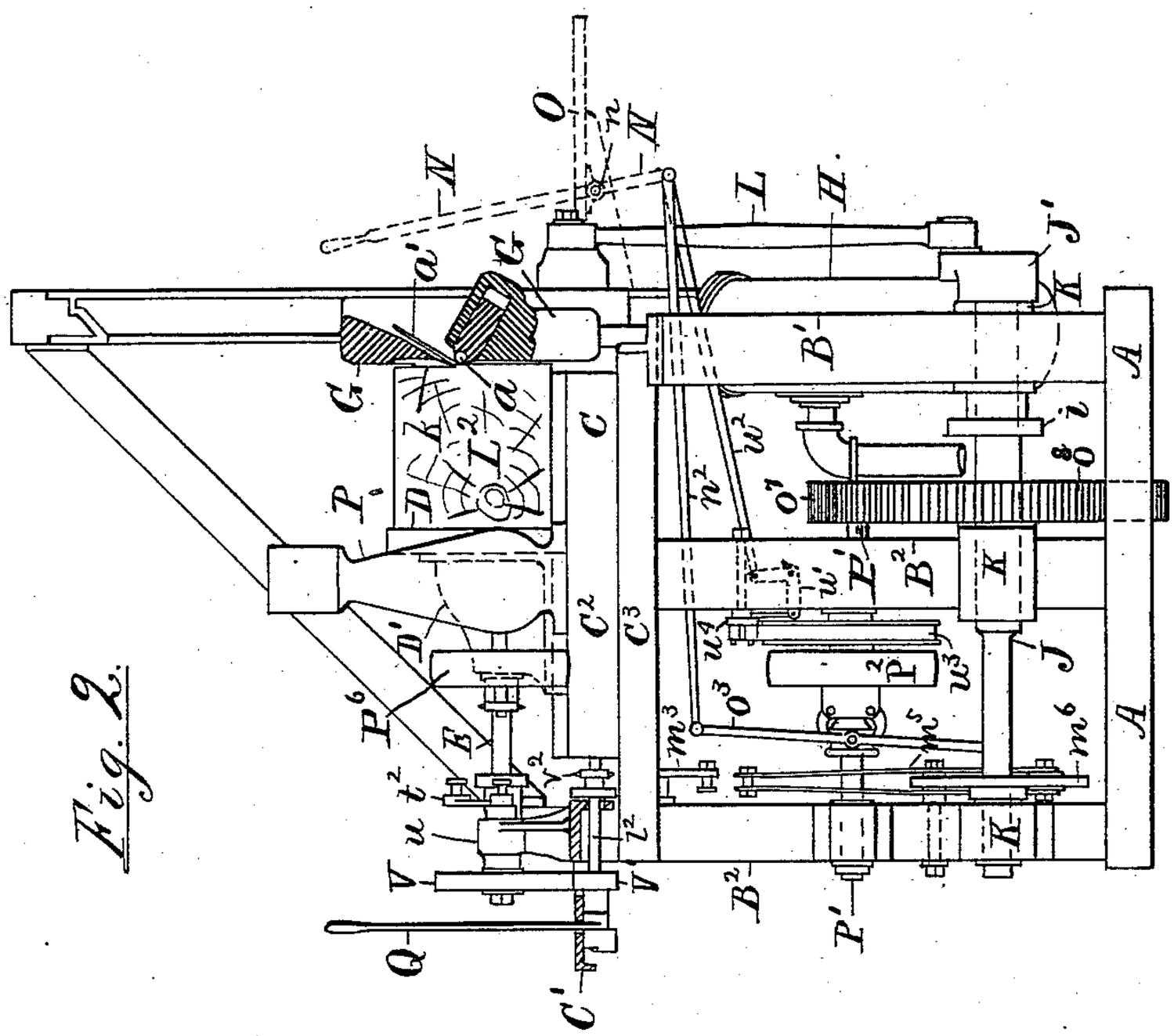



Fig. 10.

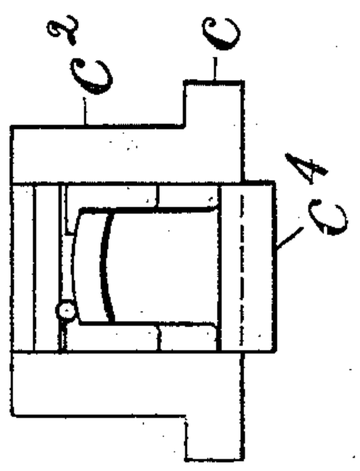
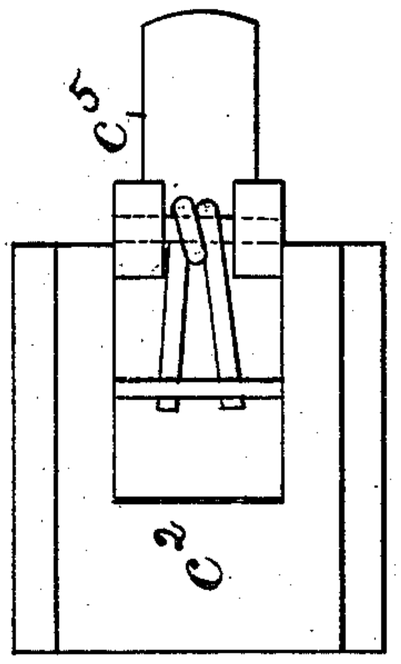



Fig. 11.

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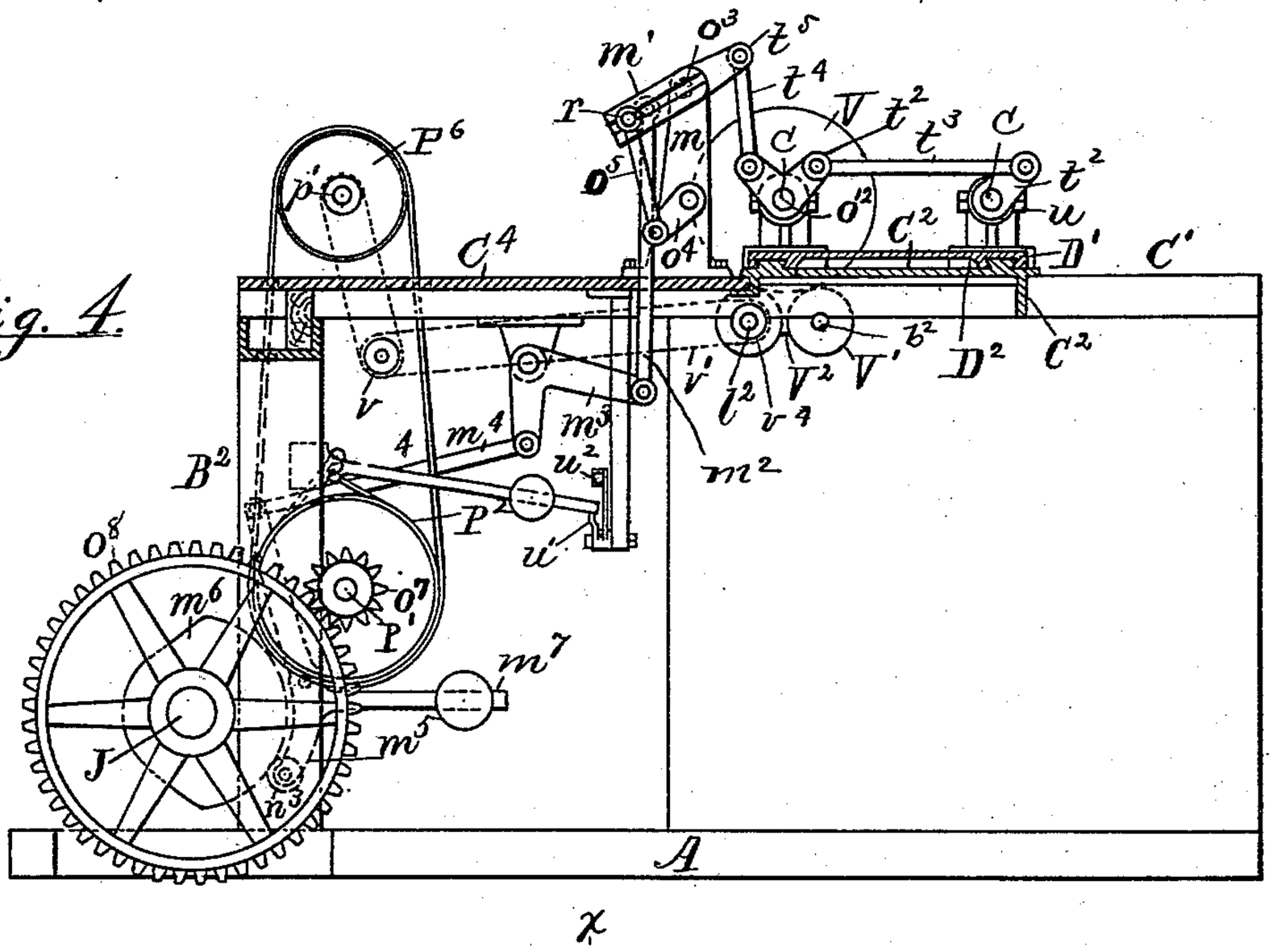
# T. S. CRANE.

## WOOD CUTTING MACHINE.

No. 379,451. Patented Mar. 13, 1888.

Fig. 4.



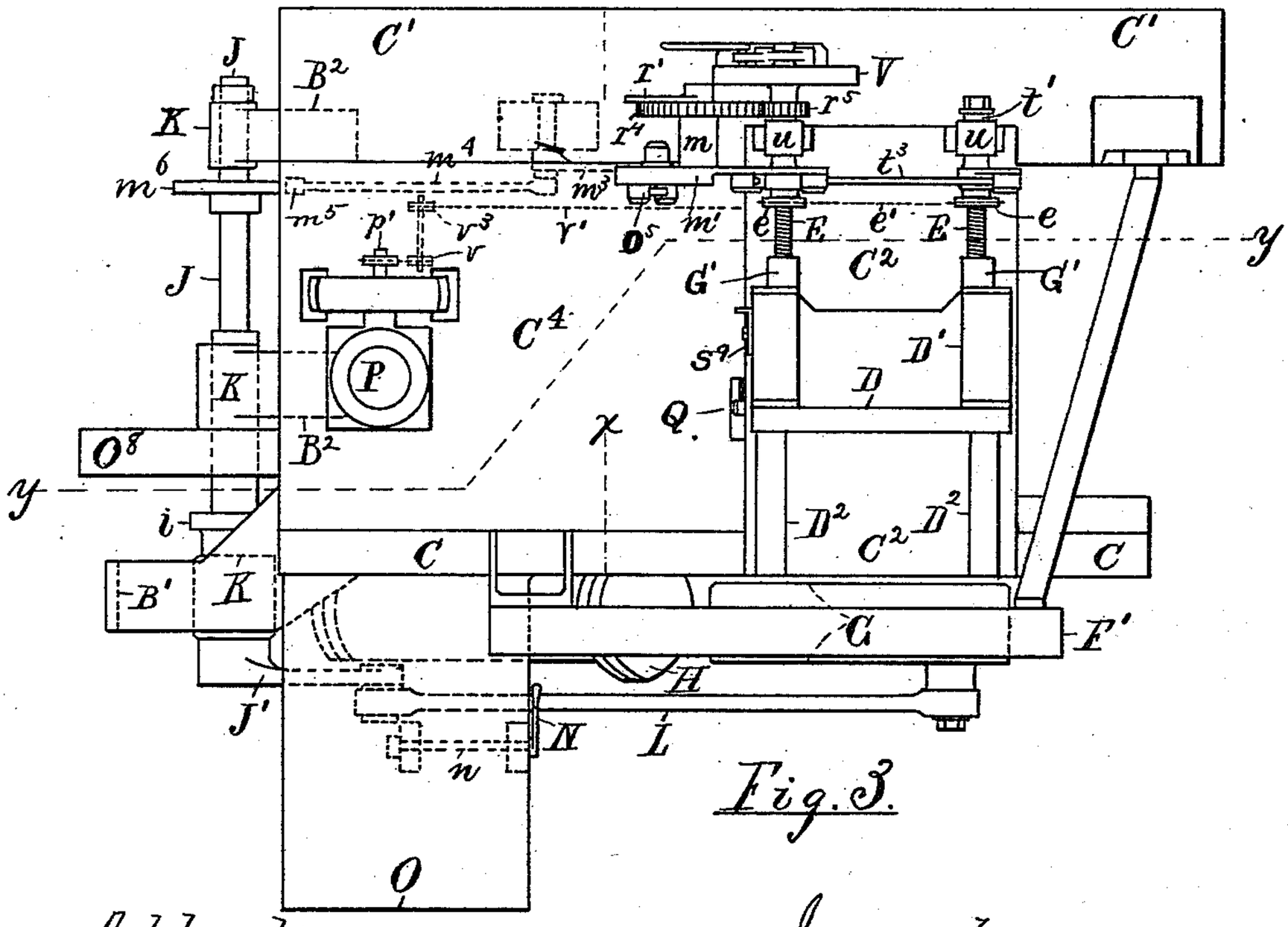




Fig. 3.

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## WOOD CUTTING MACHINE.

No. 379,451. Patented Mar. 13, 1888.

*Fig. 5.*

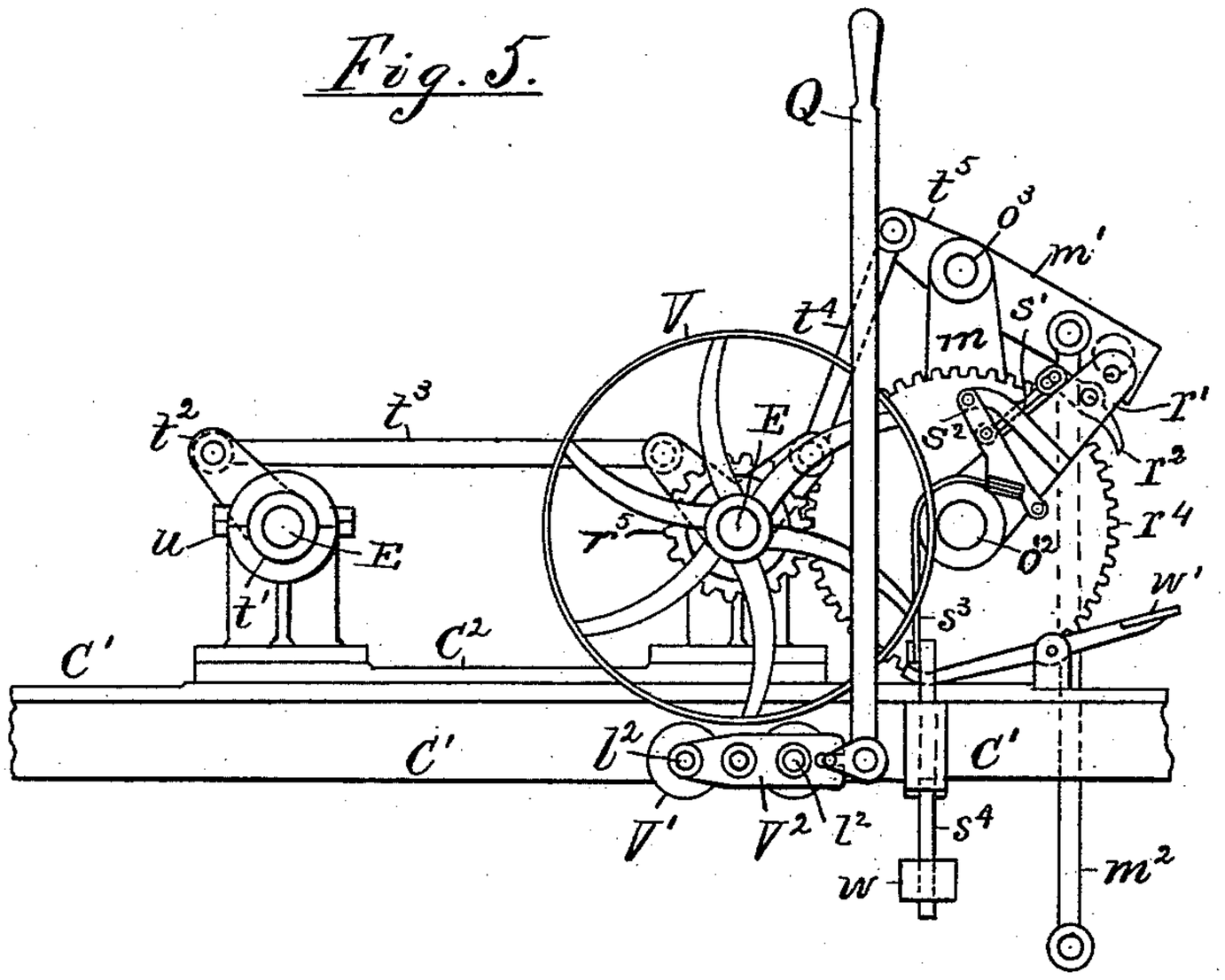
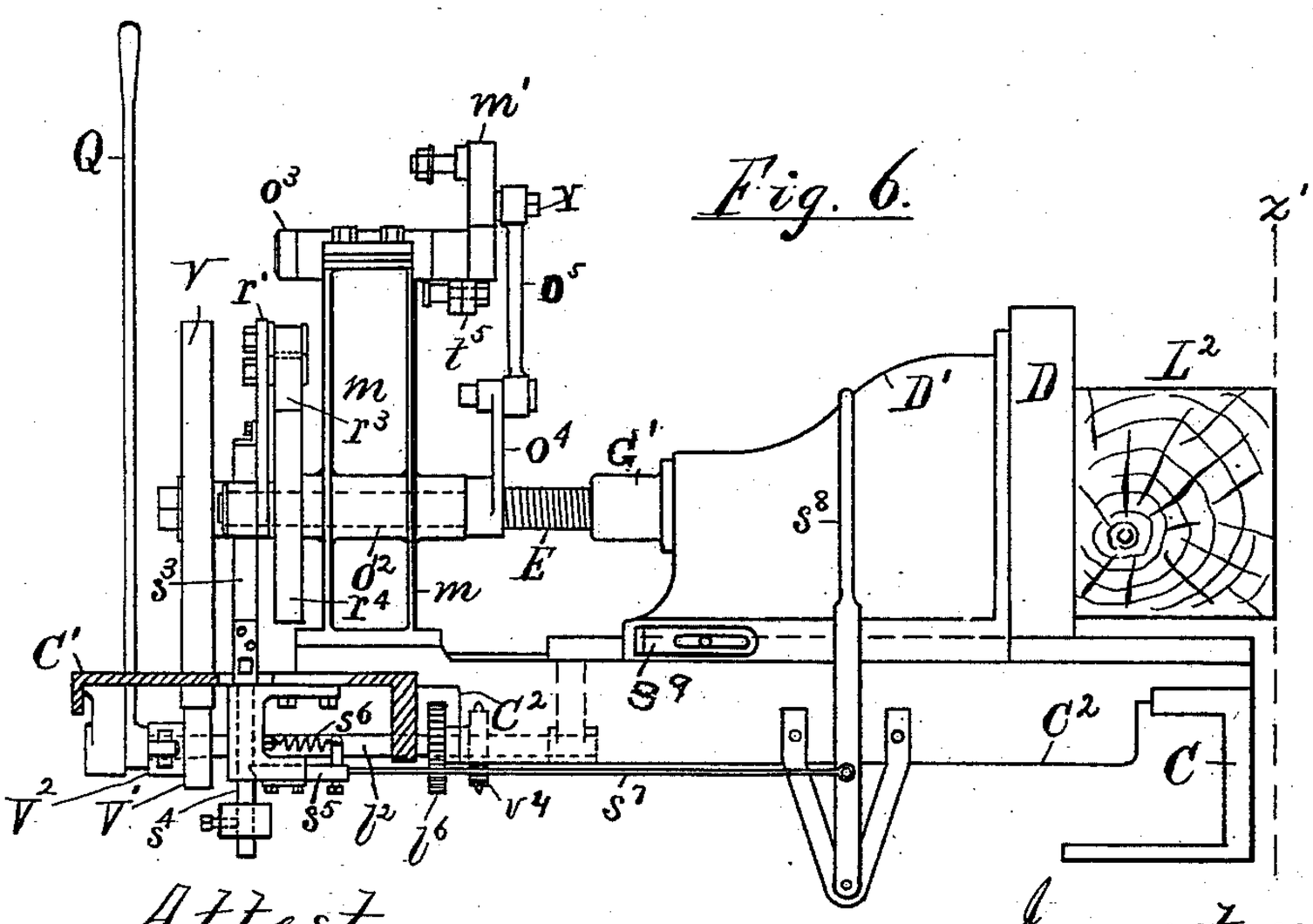



*Fig. 6.*

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## WOOD CUTTING MACHINE.

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Fig. 8.

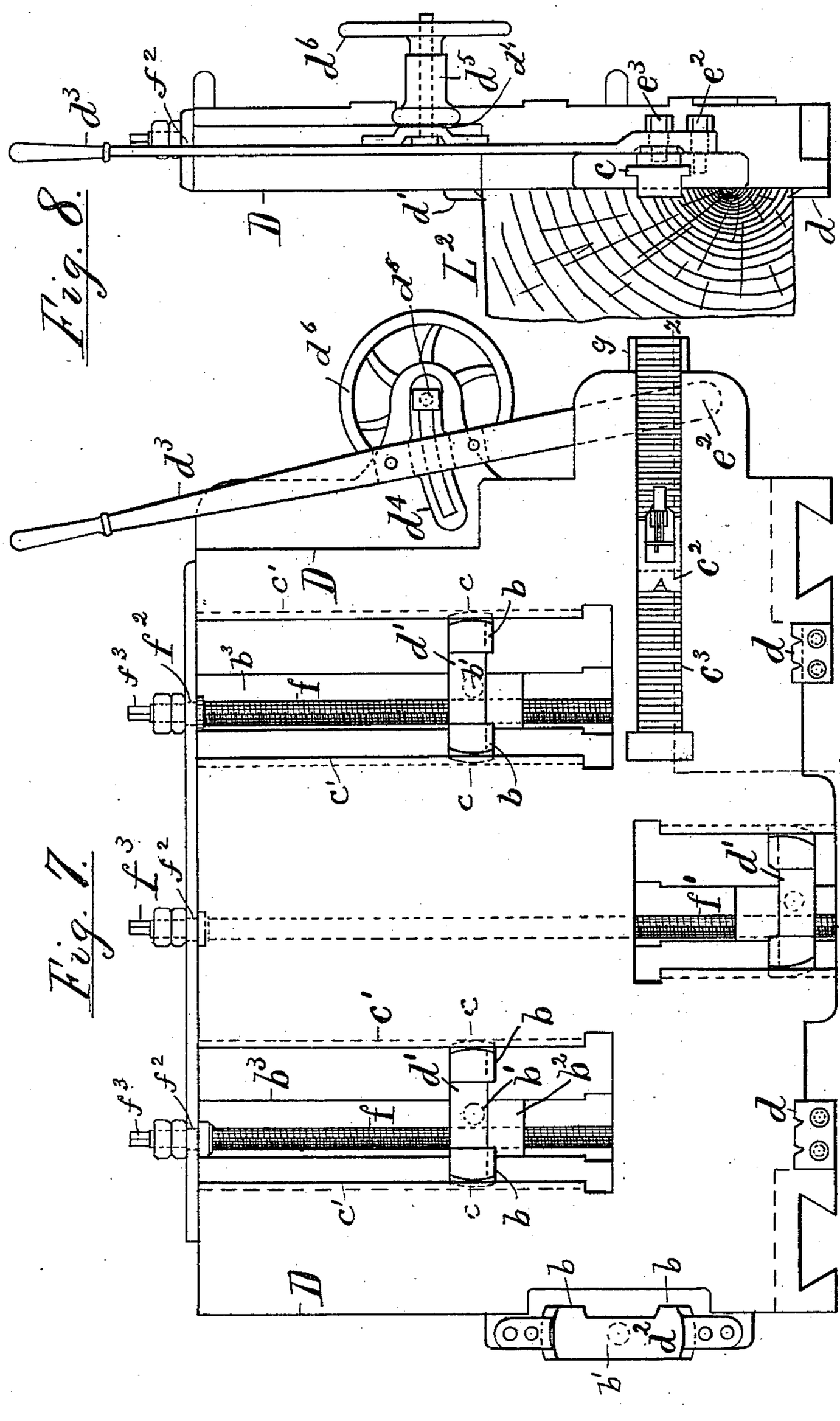


Fig. 9.

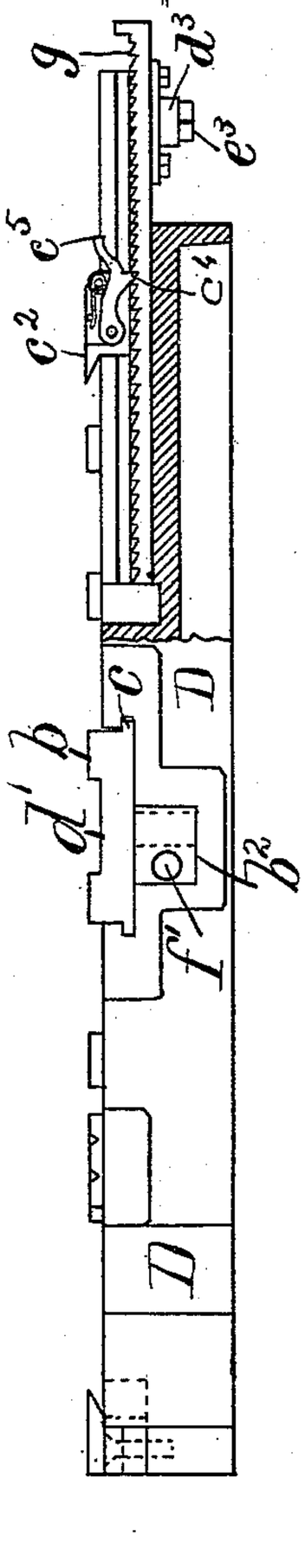


Fig. 7.




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## WOOD CUTTING MACHINE.

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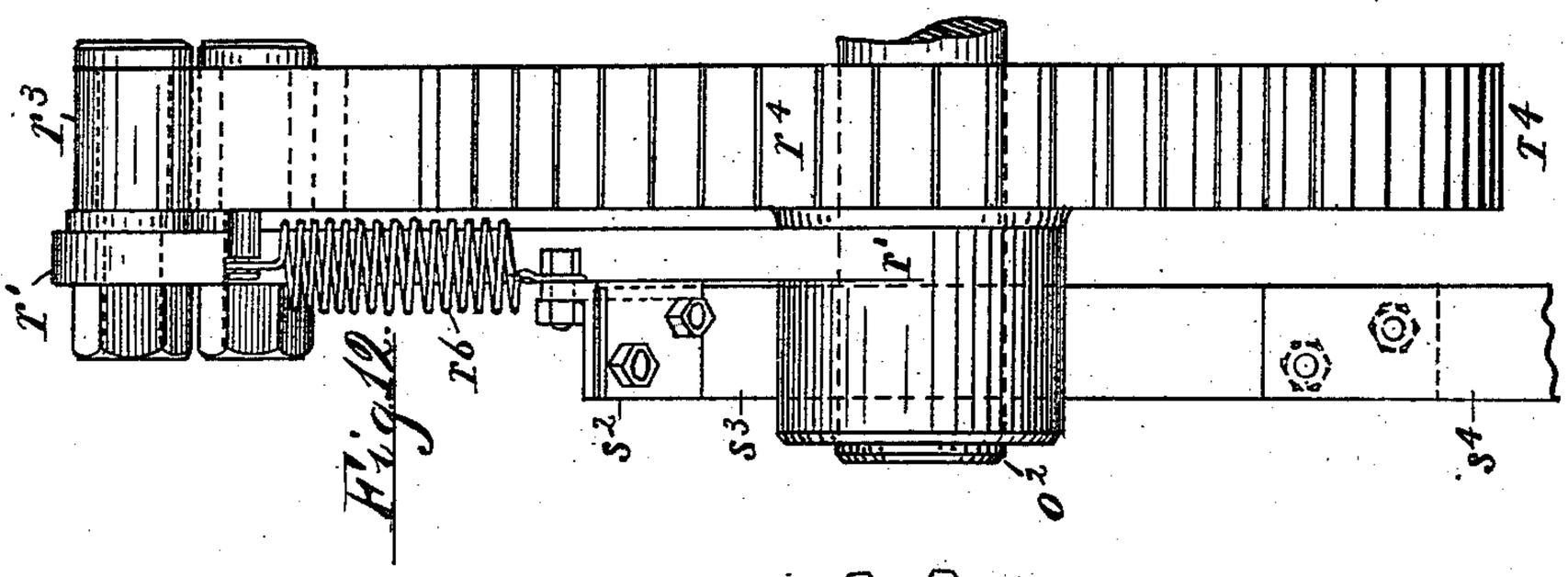


Fig. 12.

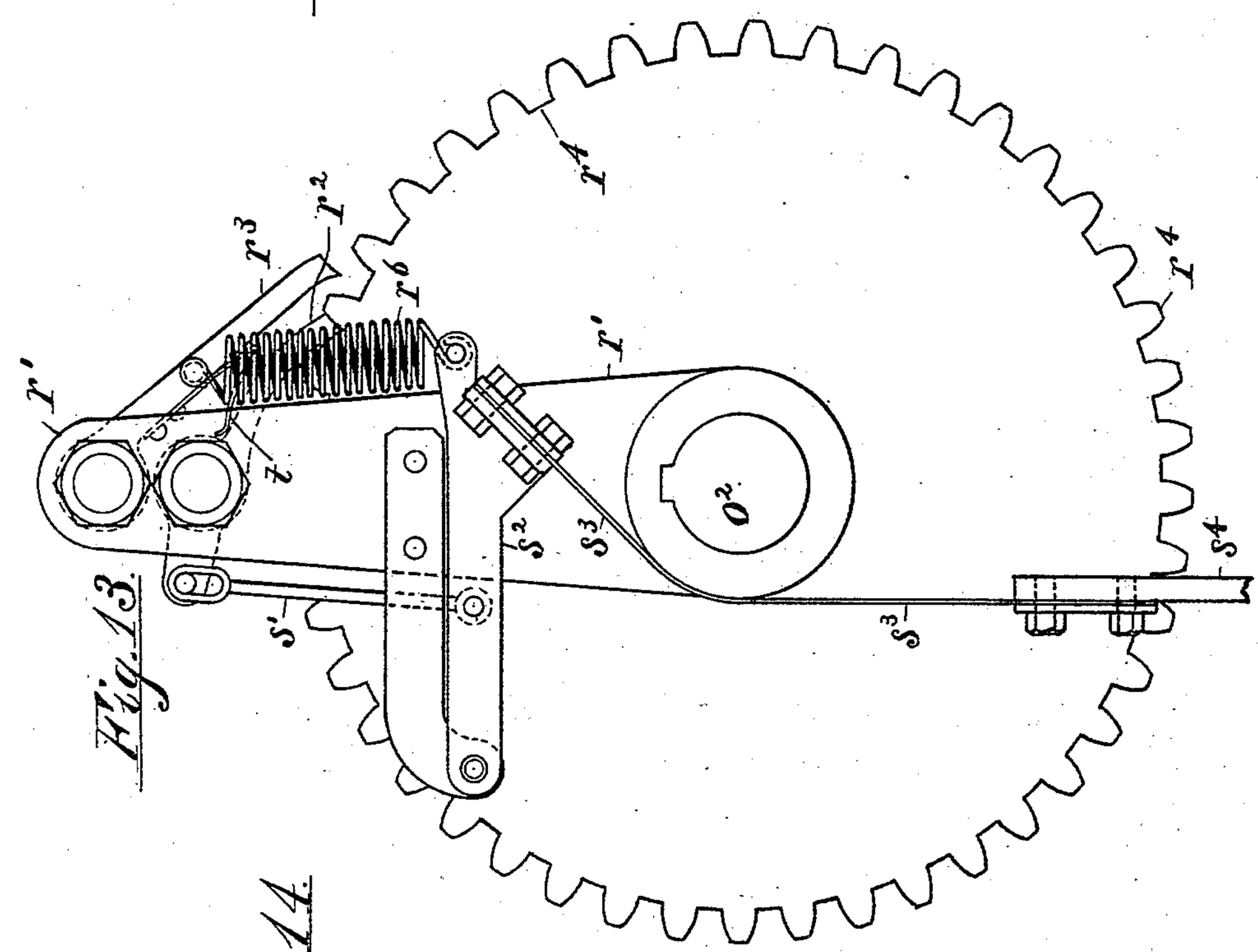


Fig. 13.

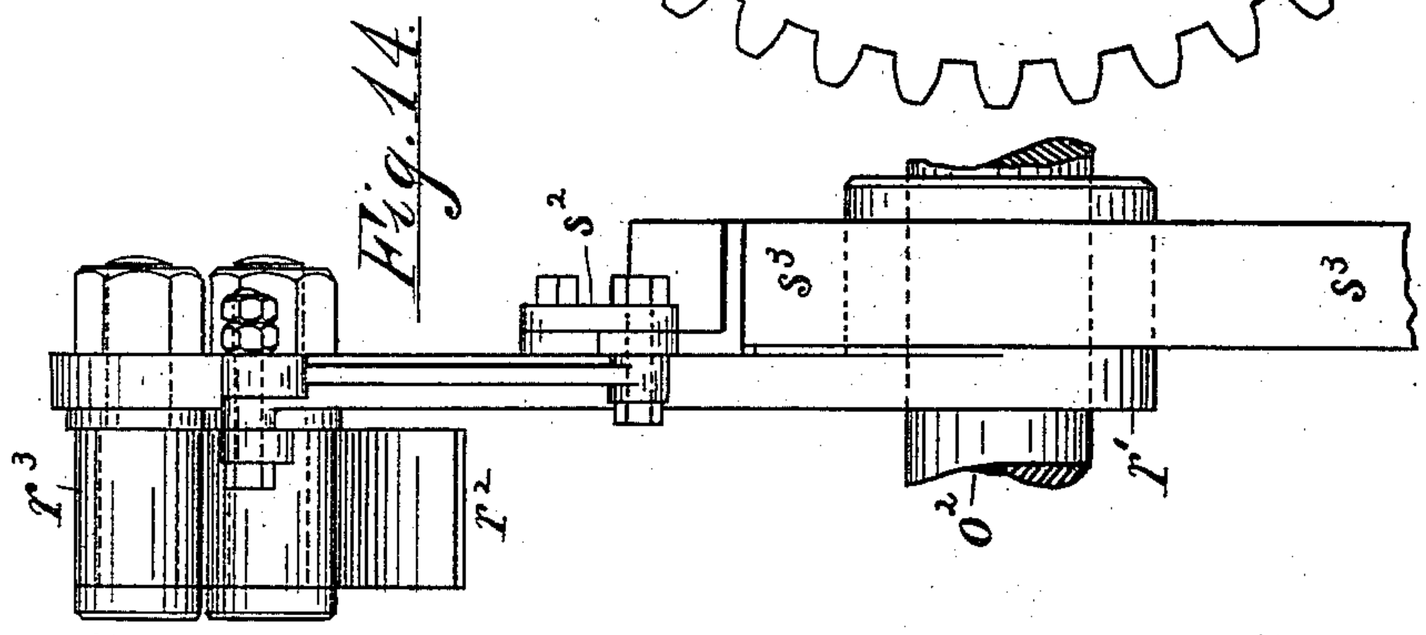


Fig. 14.

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## WOOD CUTTING MACHINE.

No. 379,451. Patented Mar. 13, 1888.

Fig. 15.

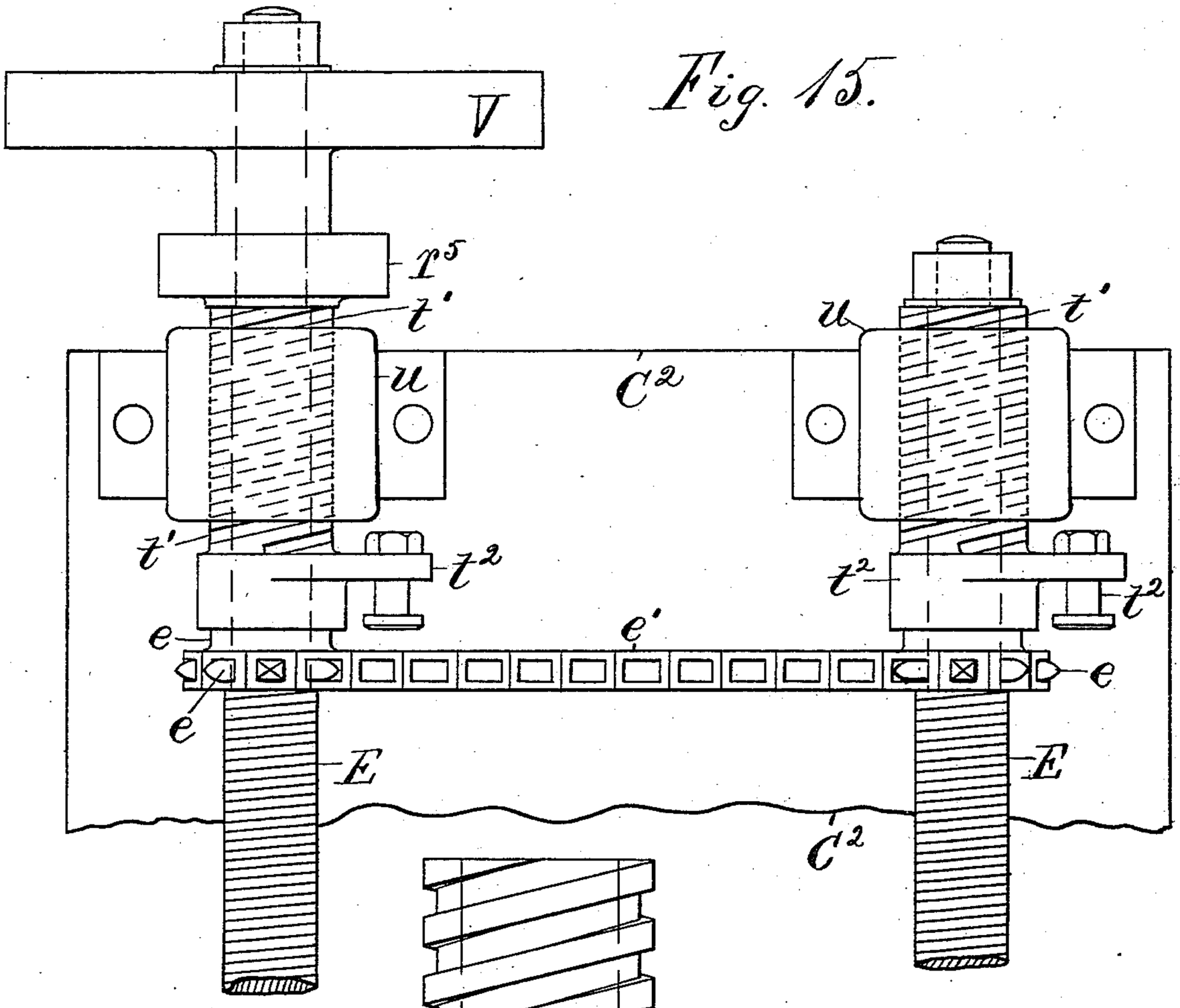
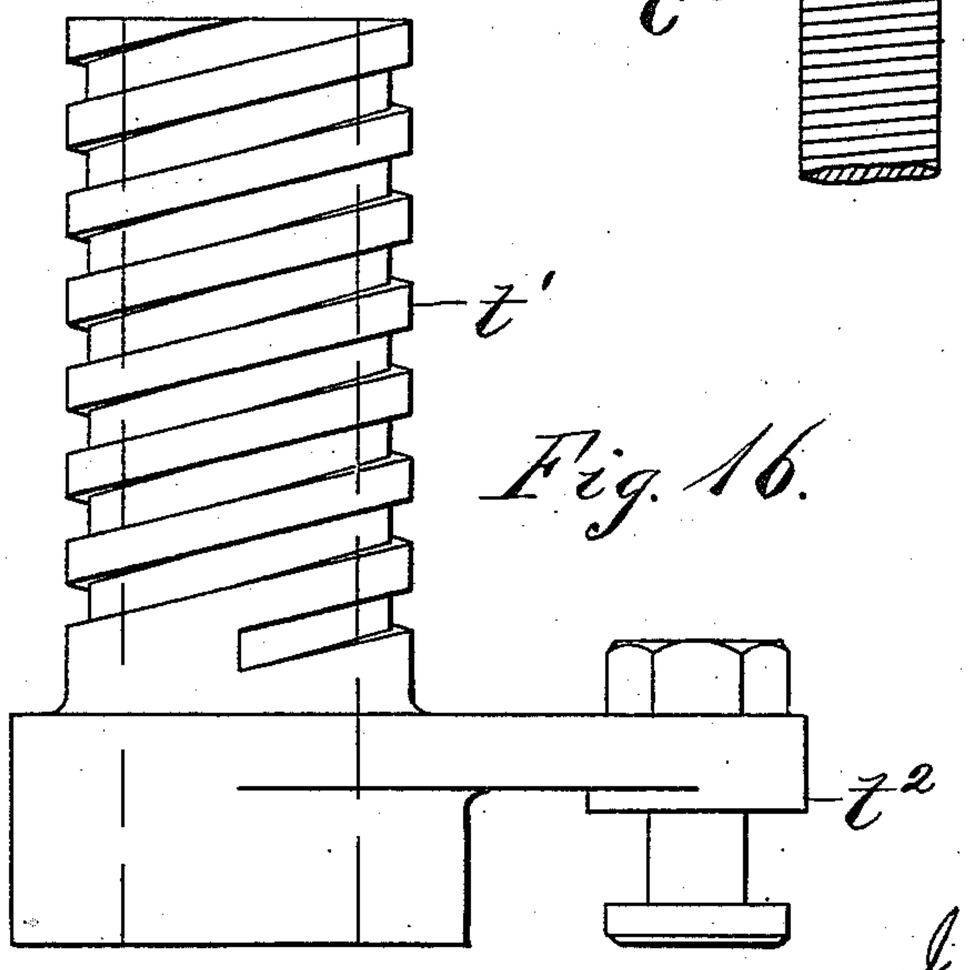



Fig. 16.

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# UNITED STATES PATENT OFFICE.

THOMAS S. CRANE, OF BRICK CHURCH, NEW JERSEY.

## WOOD-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 379,451, dated March 13, 1888.

Application filed August 1, 1887. Serial No. 245,809. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS S. CRANE, a citizen of the United States, residing at Brick Church, Essex county, New Jersey, have invented certain new and useful Improvements in Wood-Cutting Machines, which improvements are fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of wood-cutting machines in which the log is fed forward to the knife by a sliding stay-log and the knife is reciprocated over the face of the log by a carrier connected directly with the piston of a steam-cylinder.

My invention is related to the class of wood cutting or slicing machines in which a sliver is planed from the wood by a sharp knife, and in which the knife is in some cases stationary and the log movable and in others the log stationary and the knife moved either by suitable gearing or by direct connection with the piston of a steam-cylinder.

Heretofore the steam-valves of such actuating-cylinder have been reversed by dogs upon the knife carrier and tappets fixed upon the frame in the path of such dogs, and the feeding mechanism has been actuated by similar dogs and tappets, in which construction violent concussions are produced by the sudden movements of the parts, and the wear and tear upon the valve and feeding mechanisms were correspondingly great. The knife-carrier was also liable to exceed its normal stroke, and thus produce damage to the steam-cylinder, if the steam admitted to the cylinder fell beneath its normal pressure and failed to reverse the steam-piston at the proper time.

The object of this invention is to so improve this class of direct-acting wood-cutting machines that the motion of the knife-carrier may be more certain and more easily controlled; and the mechanism for operating the cylinder-valves, the feed, and the devices for retracting the stay-log may be simplified in construction and rendered more smooth and durable in their operation.

These improvements consist, primarily, in connecting the reciprocating knife-carrier by a connecting-rod with a rotating shaft, and thus securing an easy movement of the carrier when turning each end of its stroke; and it consists, also, in connecting an auxiliary steam-engine with such rotating shaft to prevent the carrier from sticking at either end of its stroke, and in actuating the steam-valves and the feed mechanism by such rotating shaft, and in retracting the stay-log by means connected with the auxiliary engine when the knife-carrier is stopped to substitute a fresh log.

My invention also consists in certain details of construction, hereinafter pointed out and claimed.

In the drawings, Figure 1 shows in front elevation, upon a scale of three-eighths of an inch to one foot, a wood-cutting machine having the steam-cylinder arranged to reciprocate the carrier at an angle of forty-five degrees before the log. Fig. 2 is an end elevation of the same. Fig. 3 is a plan of the same. Fig. 4 is an elevation of the parts in the rear of line *y y* in Fig. 3. Fig. 5 is a rear elevation, upon a larger scale, of portion of the rear beam, C′, and end of the bed $C^2$, with the feeding and retracting devices, the arm *m′* being depressed. Fig. 6 is a side elevation, upon a similar scale, of the feeding and retracting devices at the right of line *x x* in Fig. 3, the view being taken from the left side of such figure, and the arm *m′* and the cranks $o^4$ and *r′* being elevated. Fig. 7 is a front view of the stay-log, upon a still larger scale, detached from its sliding brackets. Fig. 8 is an end view of the same, and Fig. 9 is a view of the bottom edge of the same with one end broken away to the edge of the bar *g*, as on dotted line *z z* in Fig. 7. Fig. 10 is an end view, and Fig. 11 a front view, upon a much larger scale, of the lever-dog. Fig. 12 is an edge view, upon a still larger scale, of the feed-wheel and pawl-releasing devices. Fig. 13 is a side view of the same, and Fig. 14 is a view similar to Fig. 12, of the opposite side of the pawl-arm and attachments of the feed-wheel. Fig. 15 is a plan, upon a larger scale than Fig. 3, of the rear ends of the feed-screws, with their connecting-chains and the clearance-sleeves and the bearings in which they are journaled; and Fig. 16 is an outside view, upon a still larger scale, of one of the clearance-sleeves with its attached crank.

The machine shown in the drawings consists in a base-plate, A, and a bed sustained above the same by posts B, B′, and B², and consisting in a front beam, C, a rear beam, C′, a bed, C², and an end beam, C³.

D is the stay-log, and D′ its sliding brackets fitted to dovetails D² upon the bed C², and moved to and from the front edge of the beam C by screws E, which are connected together by sprocket-wheels *e* and chain *e′*. (Shown only in Figs. 3, 6, and 15.)

F F′ are the ways for the knife-carrier G, and H is the steam-cylinder, having a piston connected directly to the carrier by the piston-rod I, and mounted upon the base A by a standard, H′.

J is a crank-shaft mounted in bearings K, affixed to the posts B′ and B², and J′ is a crank connected with the carrier by a pivoted connecting-rod, L.

*h* is the steam-chest containing a suitable steam-valve supplied with steam by pipe M, and *h′* an eccentric-rod reciprocated by an eccentric, *i*, upon the shaft J. The pipe M is supplied with a throttle-valve, M′, which is actuated by a lever, N, pivoted upon a platform, O, attached to the beam C in full view of the knife-carrier and stay-log.

P is an auxiliary steam-engine of vertical type mounted on flooring C⁴ above the post B², and P′ is a shaft journaled upon said post and provided with a clutch-pulley, P², actuated by a belt, P³, from a pulley, P⁶, on the engine P.

In Fig. 4 only the shaft P′ and the pulley P⁶ of the engine are shown; but in Figs. 1, 2, and 3 the engine is designated by an upright frame and cylinder of a type very common in the open market.

The lever N is pivoted upon a shaft, *n*, which is provided with a crank, *n′*, which is connected by a rod, *n²*, to the clutch-lever *o³*. The knife-carrier is shown partly in section in Fig. 2, with the knife *k* fixed in an aperture or throat extending through the carrier adjacent to a roller, *a*, which presses upon the wood prior to the cut, and the veneer or slice *a′* passes through a throat between the knife and roller, and is discharged from the front side of the carrier. The knife projects from the side of the carrier toward the log, and the stay-log is supported and moved in such manner as to present the side of the log to the knife.

The chief power of the machine is derived from the steam operating in the cylinder H to reciprocate the rod I and carrier G, and the movement of the carrier produces, through the connecting-rod L, a rotary motion of the crank J′, whose connection with the shaft J thus produces a uniform and accurate stroke of the knife-carrier and reverses the movement of the latter smoothly at each end of its stroke. The shaft P′ is provided with a pinion, O⁷, meshing into a gear-wheel, O⁸, upon the crank-shaft J, and when the pulley P² is clutched to its shaft the small engine operates through the pulley and the wheels O⁷ and O⁸ to rotate the crank-shaft J independently of the connecting-rod L. The weight of the knife-carrier presses it strongly downward in its inclined ways, and if the crank J′ were stopped upon the lower center the slide-valve in the chest *h* would receive no steam to start the carrier again upon its upward movement. The provision of the auxiliary engine, connected with the shaft J, effects the positive movement of the shaft J to turn the center at either end of the stroke, and thus wholly prevents the cross-head from sticking at such points if stopped thereon.

To effect the rotation of the crank-shaft at the dead-centers of the crank J′, it is obviously essential that the motor should either operate continuously, or, in the case of an auxiliary engine, rotate at a different rate from the shaft J. An auxiliary engine like that shown at P would require much less power than the main cylinder H, and would naturally rotate at a much higher speed than the crank which is connected with the knife-carrier. A belt applied in the same manner as the belt P³, but actuated by any other source of power than the auxiliary engine P, would obviously produce an equivalent result. The log is held during the cut by dogs of peculiar construction attached to the stay-log D.

*b³* are grooves in the stay-log; *b²*, nut-blocks sliding therein and actuated by screws *f f′*.

*d′* are dogs with teeth *b* at each end, and pivoted by studs at their middle in sockets *b′* in the blocks. Tongues *c* on the ends of the dogs are fitted in grooves *c′* within the surface of the stay-log to steady the teeth *b* when pressed into the wood. Two dogs, *d*, are secured to the lower edge of the stay-log, upon which the log rests when first applied, and a pivoted dog, *d²*, constructed like the dogs *d′*, is affixed to one end of the stay-log, and a sliding dog, *c²*, is fitted to a groove, *c³*, at the opposite end of the stay-log and actuated by a lever, *d³*, to press the log toward the pivoted dog *d²*. A toothed bar, *g*, is fitted in the groove *c³*, and the lever *d³* is pivoted to the stay-log at *e²* and to the bar at *e³*, and the dog *c²* is provided with a spring-pawl, *c⁴*, which presses in the teeth upon the bar *g*, and is pushed forward intermittently when the bar is reciprocated by the lever. The dog *c²* is shown in detail in Figs. 10 and 11, with the tooth of the pawl projected below its lower surface, so as to enter the teeth in the bar *g*, while the dog itself is provided with tongues *c*, fitted in corresponding grooves below the surface of the stay-log to resist the strain of the wood when the teeth of the dog are jammed therein. The pawl is provided with a handle, *c⁵*, by which it may be lifted out of the teeth of the bar *g* and slid outward to clear the log when placed upon the stay-log. The dog may then be pushed forward to contact with the end of the log, and the reciprocation of the bar *g* then operates through the pawl to press the dog into the end of the wood. The lever is

furnished with a slotted segment, $d^4$, and clamp-bolt $d^5$, having a nut-wheel, $d^6$, by which the lever may be clamped to hold the dog into the wood when adjusted. The log is first placed in contact with the dogs $d$ and $d^2$, both of which are upon the sides of the log opposed to the strain of the knife, and the dogs $d'$ are afterward pressed by the screws $f$ and $f'$ into contact with the wood to hold it against the stationary dogs during the cutting operation. Before the screws $f$ are operated the dog $c^2$ is pressed into the wood to jam it firmly against the dog $d^2$.

It will be noticed that each of the dogs $d'$ and $d^2$ has two teeth $b$, and is adapted to turn on its central pivot, $b'$, as its teeth find a bearing upon the wood, and each dog thus operates upon two distinct points in the wood as perfectly as two separate dogs, while requiring but a single screw to operate both of the teeth $b$, where the dogs are movable, as at $d'$.

The screws are journaled in bearings $f^2$ in the upper edge of the stay-log, and are provided with heads $f^3$ for the application of a crank or hand-wrench.

Fig. 4 shows in front view the train of mechanism for operating the feeding-pawls; and Fig. 5 shows, upon a larger scale, the feed-wheels $r^4$ and $r^5$, actuated by such pawls.

$m$ is a standard affixed to the beam C', adjacent to one of the screws E, and carries two oscillating shafts, $o^2$ and $o^3$. The shaft $o^3$ carries a feed-arm, $m'$, containing an adjustable pin, $r$, which is oscillated by a cam, $m^6$, upon the crank-shaft J', the movement being transmitted to the arm $m'$ by rod $m^2$, bell crank $m^3$, link $m^4$, and lever $m^5$. The lever $m^5$ is pivoted upon the post $B^2$, and is provided with an anti-friction roller, $n^3$, to bear upon the cam. The shaft $o^{12}$ is provided at its inner end with a crank, $o^4$, which is oscillated by a link, $o^5$, attached to the arm $m'$ by a pin, $r$, adjustable to and from the shaft $o^3$, and the shaft $o^{12}$ carries at its outer end the pawl-crank $r'$, which oscillates the pawls $r^2$ and $r^3$ upon the teeth of a wheel, $r^4$. This wheel meshes into a feed-wheel, $r^5$, upon one of the screws E, and as the arm $m'$ has a uniform oscillation the adjustment of the pin $r$ in the arm $m'$ determines the stroke of the shaft $o^{12}$ and of the feed pawl or pawls, and thus varies the rotation of the screws E and the degree of feed imparted to the log. The pawl $r^3$ is omitted in Fig. 5, and is combined with the pawl $r^2$ to vary the feed one-half a tooth when desired, as is common in such constructions.

The pawls are connected by means of a link, $s'$, lever $s^2$, and strap $s^3$ with a weight, $w$, for lifting them from the teeth of the wheel $r^4$ automatically when the log is all cut. The lever $s^2$ is pivoted to a projection from the crank $r'$, and the strap is attached at one end to the lever and at the other end to a bar, $s^4$, to which the weight is affixed, and is sustained during the feeding operation by a bolt, $s^5$, which operates in a tapering notch in the side of the bar, as shown in Fig. 6.

The end of the lever $s^2$ is connected by a spring, $r^6$, with the pawl $r^3$, and the spring operates to counterbalance the weight of the lever $s^2$, while the said weight operates through the spring to press the pawls effectively into the teeth of the feed-wheel, the pawl $r^3$ having a leaf-spring, $t$, affixed to its under side to press the pawl $r^2$ toward the wheel in the desired manner.

The rod $s^4$ and weight $w$ are shown in Fig. 5 as if dropped, thus pulling the strap $s^3$ downward and lifting the pawls from the feeding-teeth, as shown by the pawl $r^2$; but in Fig. 13 the pawl $r^2$ is shown as in operation upon the teeth, with the pawl $r^3$ as if lifted by the rotation of the teeth, and not yet dropped into the space between the two. To bring the pawls into action and set the feed into operation, the bar $s^4$ is lifted by a treadle, $w'$, the bar and weight being then sustained by the bolt $s^5$ and the pawls operating as in other constructions. The bolt is pressed into the notch by a spring, $s^6$, and is connected by a rod, $s^7$, with a lever, $s^8$, which projects upward by the side of the stay-log brackets D' into the path of a tappet, $s^9$, attached to one of such brackets.

The path of the knife in front of the beam C is indicated by the dotted line $z'$ in Fig. 6, with the front face of the log $L^2$ corresponding therewith, and the tappet $s^9$ is so adjusted that when the log is all cut and the dogs upon the stay-log D are nearly up to such line the tappet will move the lever $s^8$, and by withdrawing the bolt $s^5$ permit the fall of the weight and rod $s^4$ and the lifting of the pawls from the feed-wheel $r^4$. The oscillation of the arm $m'$ and the crank $r'$ then continues without producing any further feed.

It will be noticed that the levers $s^2$ and the strap $s^3$ are oscillated with the crank $r'$, and the strap is therefore made of sufficient length to remain slack when the bar $s^4$ is locked in its elevated position, as shown in Fig. 13, to avoid any tension upon the lever $s^2$, which might displace the pawls from the teeth of the feed-wheel.

The screws E operate upon stay-log brackets by nuts G' affixed thereto, and the screws are journaled to rotate without longitudinal movement in oscillating sleeves $t'$, which are fitted to bearings $u$ upon the bed C'.

The bearings are threaded internally, and the sleeves are formed with external thread to fit the same, and are provided with cranks $t^2$, by which they are oscillated through the medium of a rod, $t^3$, and a link, $t^4$, connected with a crank, $t^5$, formed upon the arm $m'$.

The rotation of the sleeves in the threaded bearings $u$ operates to shift the screws longitudinally, and thus moves the log to or from the path of the knife. The thread on the sleeves is of inch-and-one-half pitch, and the rotation of the cranks $t^2$ is sixty degrees, to retract the log one quarter of an inch after each cut, so that the knife may move over the cut surface to the upper end of its stroke without rubbing upon the wood.

The arm $m'$ is oscillated by the cam $m^6$ at each end of the carrier's stroke, so as to actuate the feed in advance of the cut, and the threaded sleeves $t'$ are thus oscillated at the same time and operate to move the stay-log forward into the path of the knife at the commencement of each cut.

The position of the parts shown in Figs. 4 and 5 is that during the cutting operation, excepting that the pawl $r^2$ would be in the teeth of the wheel $r^4$ if feeding, and such position would be reversed at the lower end of the knife-carrier's movement to retract the log and to bring the pawl into position for feeding just before the commencement of the cut.

In Figs. 2, 3, 5, and 6 is shown the means for entirely withdrawing the stay-log from the knife when a new log is to be inserted, and this means consists in a friction-wheel, V, affixed to the end of the feed-screw E and rotated in either direction at pleasure by pressing against its periphery one or two leather wheels V′, which are rotated in opposite directions. The wheels V′ are rotated by shafts $l^2$, journaled in an oscillating bearing, $V^2$, and are rotated by connections to the auxiliary engine, as shown in Figs. 3 and 4.

In Figs. 3 and 4, $v$ is a chain-wheel driven by a chain from the shaft P′ of the engine P, and $v'$ is a chain driven by a similar wheel, $v^3$, connected therewith and applied to a chain-wheel, $v^4$, upon one of the shafts $l^2$. (Shown in Figs. 4 and 6.) The shafts $l^2$ are connected by a pair of spur-wheels, $l^6$, (shown only in Figs. 2 and 6,) and which therefore rotate one of them in an opposite direction from the other. A hand-lever, Q, is pivoted upon the beam C′ adjacent to the oscillating bearing $V^2$, and may be operated to press either of the wheels V′ upon the wheel V at the pleasure of the operator. When the pawls are withdrawn from the feed-wheel $r^4$, the screws may thus be rotated by the frictional contact of the wheels V V′ to draw the stay-log back quickly to admit a log, or to push the same forward in readiness for cutting.

If required, a guide may be provided to hold the lever Q in a central position when not used.

From the above description it will be seen how the reciprocating knife-carrier and its attached piston-rod are prevented from moving too far at either end of their stroke, and it will be obvious that any weight upon the crank-shaft J—as, for instance, the wheel $O^8$—would operate as a fly-wheel and effect the continued rotation of the shaft without any auxiliary motor, such as is furnished by the engine P.

The auxiliary engine is designed in practice to operate continuously, and the clutch-pulley $P^2$ is thus in readiness at any moment to engage with the shaft P′ to assist in rotating the crank-shaft. Such continuous rotation of the engine maintains through the wheels $v$ $v^3$ $v^4$ and chain $v'$ a continuous rotation of the friction-wheels V′, and as these wheels are rotated in opposite directions by the gears $l^6$ the auxiliary engine thus furnishes a constant source of power to propel the stay-log to and from the knife-carrier as when the log is consumed, although the auxiliary engine may be unclutched from the crank-shaft and the movements of the carrier arrested.

In Fig. 4 it will be noticed that the cam is formed with two portions of different radius, both concentric with the shaft J, and that the roller $n^3$ is shown in contact with the greater portion, which is the position occupied by the parts during the cut.

A weighted arm, $m^7$, is affixed to the lever $m^5$ to keep the roller in contact with the cam, and the parts of the cam which unite the two concentric portions, being at opposite sides of the crank-shaft, operate to actuate the feeding and clearance devices or threaded sleeves $t'$ at the opposite ends of the knife-carrier's stroke. The rotary motion of the cam thus effects the movement of the feed at the opposite ends of the stroke with great power and without concussion, and the connection with the feed arm $m'$ of the threaded sleeves $t'$, which retract the feed-screws and stay-log after each stroke, enables the cam and the parts which oscillate the arm to perform a double function, and thus reduces the number of parts, while securing an exact coincidence in all the movements.

My invention is adapted to cut veneers from hard or soft wood, but if constructed of suitable strength may be used to cut directly from the log smooth planed boards adapted for the manufacture of cigar-boxes, barrel-staves, or packing-boxes of any description. I have cut in such a machine hard oak and walnut logs over eighteen inches in width and four feet long into boards three-quarters of an inch thick, one such board being cut from the log at each stroke of the knife-carrier and its attached steam-piston, and such strokes being performed from twenty to forty times per minute, as desired.

I am aware that a saw-gate provided with a gang of saws has been connected, through the medium of a rock-shaft, a sliding joint in a lever, and a connecting-rod, to a rotary crank-shaft, by which the stroke of the saw-gate was regulated; and I do not therefore claim such means of regulating the stroke, broadly.

In my construction the knife-carrier passes over the side of the log with a knife-blade projecting beyond its plane surface, and the connecting-rod is pivoted directly to such carrier and to the rotary crank, by which great simplicity and cheapness of construction are effected. Furthermore, the location of the crank-shaft at the end of the steam-cylinder opposite to that upon which the knife-carrier reciprocates secures a peculiarly compact construction, as it affords a suitable length for the connecting-rod and avoids extending the machine to a great length, which would be unavoidable if the reciprocating carrier were connected with a crank-shaft in the opposite direction.

It is obviously immaterial to the co-oper-

ation of the knife carrier, the connected crank shaft, and the auxiliary motor (which prevents the main crank from sticking on the centers) whether the carrier be moved in an inclined position, as shown in Fig. 1 of the drawings, or be moved horizontally or vertically by a horizontal or vertical arrangement of the ways F F'. It is also immaterial how the auxiliary motor operates upon the crank-shaft J, provided it operates, as set forth above, to rotate the shaft independently of the power transmitted from the cylinder H through the connecting-rod L. A moving belt or other gearing operated by any auxiliary power would obviously be an equivalent for the belt $P^3$, actuated by the pulley $P^6$ upon the engine P.

Having thus set forth my invention, what I claim is—

1. In a veneer or wood slicing machine, the combination, with a reciprocating carrier provided with a knife projected from the side of the carrier, of a reciprocating steam piston-rod attached directly to such carrier, a rotary crank, and a connecting-rod pivoted directly to such carrier and crank to regulate the stroke of the piston-rod and carrier, and feeding mechanism actuated by the rotary crank-shaft to feed the side of the log toward the knife, substantially as and for the purpose set forth.

2. In a veneer or wood slicing machine, the combination, with a reciprocating knife-carrier provided with a knife projected from the side of the carrier, of a reciprocating steam piston-rod attached directly to such carrier, a rotary crank, and a connecting-rod pivoted directly to such carrier and crank, a movable stay-log presenting the side of the log toward the knife, feeding mechanism for intermittently actuating the stay log, and an auxiliary motor for turning the crank at the dead-centers, as and for the purpose set forth.

3. In a veneer or wood slicing machine, the combination, with a reciprocating knife-carrier provided with a knife projected from the side of the carrier, of a reciprocating steam piston-rod attached directly to such carrier, a rotary crank, and a connecting-rod pivoted directly to such carrier and crank, a movable stay-log presenting the side of the log toward the knife, feeding mechanism for intermittently actuating the stay-log, and an auxiliary motor-engine connected with the said crank and rotated at a different rate from the said crank to maintain its motion at the dead-centers, as and for the purpose set forth.

4. In a veneer or wood slicing machine, the combination, with a reciprocating knife-carrier provided with a knife projected from the side of the carrier, of a reciprocating steam piston-rod attached directly to such carrier, a rotary crank, and a connecting-rod pivoted directly to such carrier and crank to regulate the stroke of the piston-rod and carrier, a movable stay-log with feeding mechanism for feeding the stay-log intermittently toward the knife, and an auxiliary motor connected with the said crank by a clutch mechanism and operated to turn the said crank at the centers, and to reverse the feeding mechanism when desired, substantially as herein set forth.

5. In a veneer-cutting machine, the combination, with a reciprocating knife-carrier, of a steam piston-rod to reciprocate such carrier, a rotary crank connected with such carrier by a pivoted connecting-rod, a cog-wheel having shaft connected with said crank, an intermediate shaft provided with pinion and with clutch-pulley, and an auxiliary engine connected with such clutch-pulley, as and for the purpose set forth.

6. In a veneer-cutting machine, the combination, with a reciprocating knife-carrier, of a steam piston-rod to reciprocate such carrier, a rotary crank-shaft and crank connected with such carrier by a connecting-rod, a stay-log movable to and from the knife-carrier, screws journaled in bearings and fitted to nuts upon the stay-log, detachable feed mechanism applied to such screws, means for connecting the screws to rotate together, a friction-pulley upon one of said screws, and a rotating friction-wheel with means for pressing it against such friction-pulley to retract the stay-log when the feeding mechanism is detached.

7. In a veneer-cutting machine, the combination, with a reciprocating knife-carrier, of a steam piston-rod to reciprocate such carrier, a rotary crank-shaft and crank connected with such carrier by a connecting-rod, a stay-log movable to and from the knife-carrier, screws journaled in bearings and fitted to nuts upon the stay-log, detachable feed mechanism applied to such screws, means for connecting the screws to rotate together, a friction pulley upon one of said screws, two friction-wheels rotated in opposite directions, and means for pressing either of them at pleasure upon the friction-pulley, as and for the purpose set forth.

8. In a veneer-cutting machine, the combination, with a reciprocating knife-carrier, of a steam piston-rod to reciprocate such carrier, a rotary crank-shaft and crank connected with such carrier by a connecting-rod, a stay-log movable to and from the knife-carrier, screws journaled in bearings and fitted to nuts upon the stay-log, detachable feed mechanism applied to such screws, means for connecting the screws to rotate together, a friction-pulley upon one of said screws, an auxiliary engine detachably connected with the crank-shaft, and two friction-wheels rotated in opposite directions by said auxiliary engine, and means for pressing either of them at pleasure upon the friction-pulley, as and for the purpose set forth.

9. In a veneer-cutting machine, the combination, with a reciprocating knife-carrier, of a steam piston-rod to reciprocate such carrier, a rotary crank-shaft and crank connected with such carrier by a connecting-rod, a stay-log movable to and from the knife-carrier, screws fitted to nuts upon the stay-log, sleeves threaded externally and mounted in threaded bearings,

and having the screws journaled therein with shoulders to prevent longitudinal movement, feed mechanism applied to such screws, and means for actuating such feed mechanism and for oscillating the threaded sleeves at the opposite ends of the knife-carrier's stroke, as and for the purpose set forth.

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

THOS. S. CRANE.

Witnesses:
HENRY J. MILLER,
F. C. FISCHER.