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H. S. SMITH.

MACHINE FOR CUTTING LUMBER.

No. 342,939. Patented June 1, 1886.

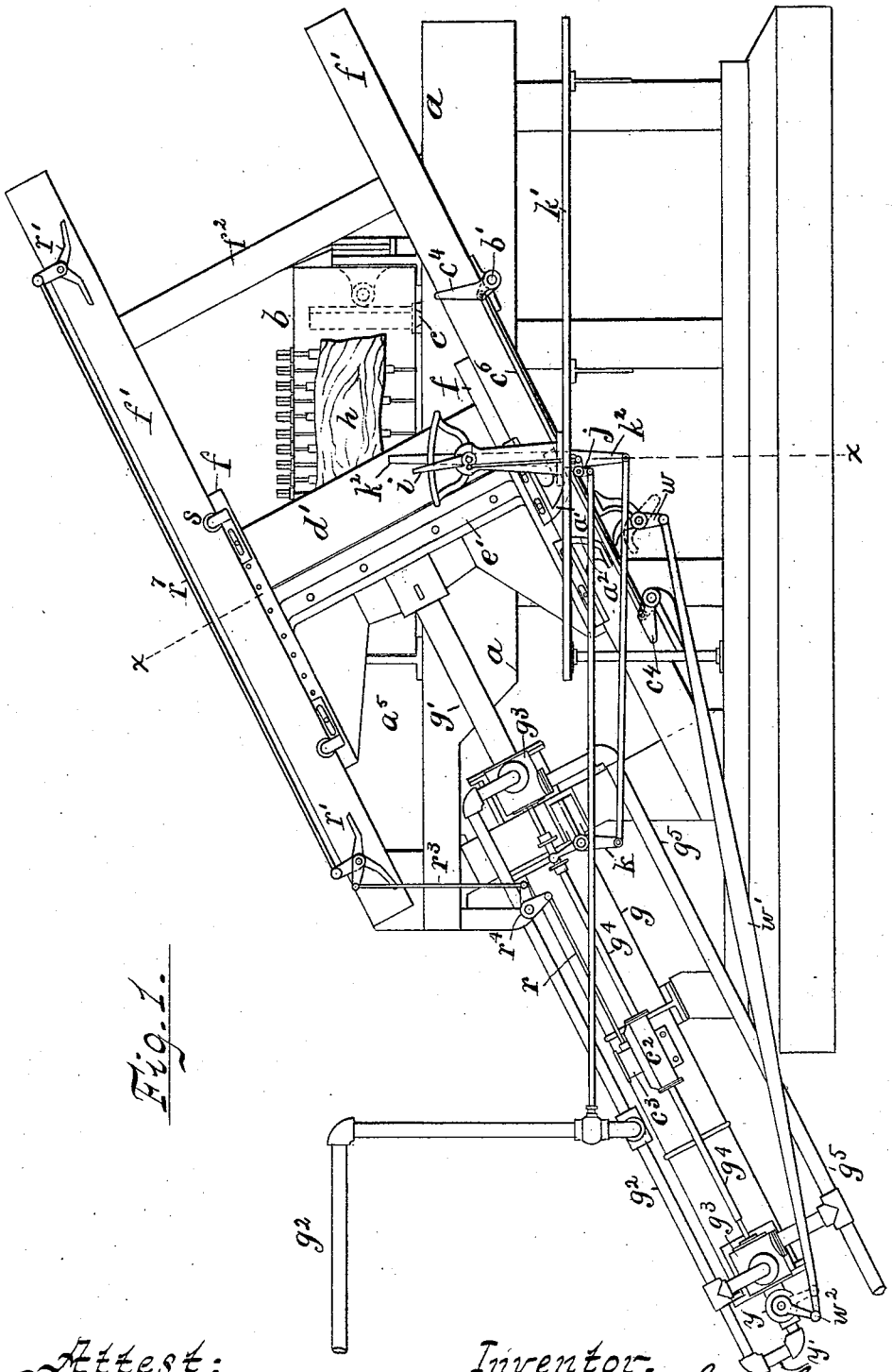

Fig. 1.

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L J Stockman

Inventor.
Howard S. Smith
per John E Tasker atty

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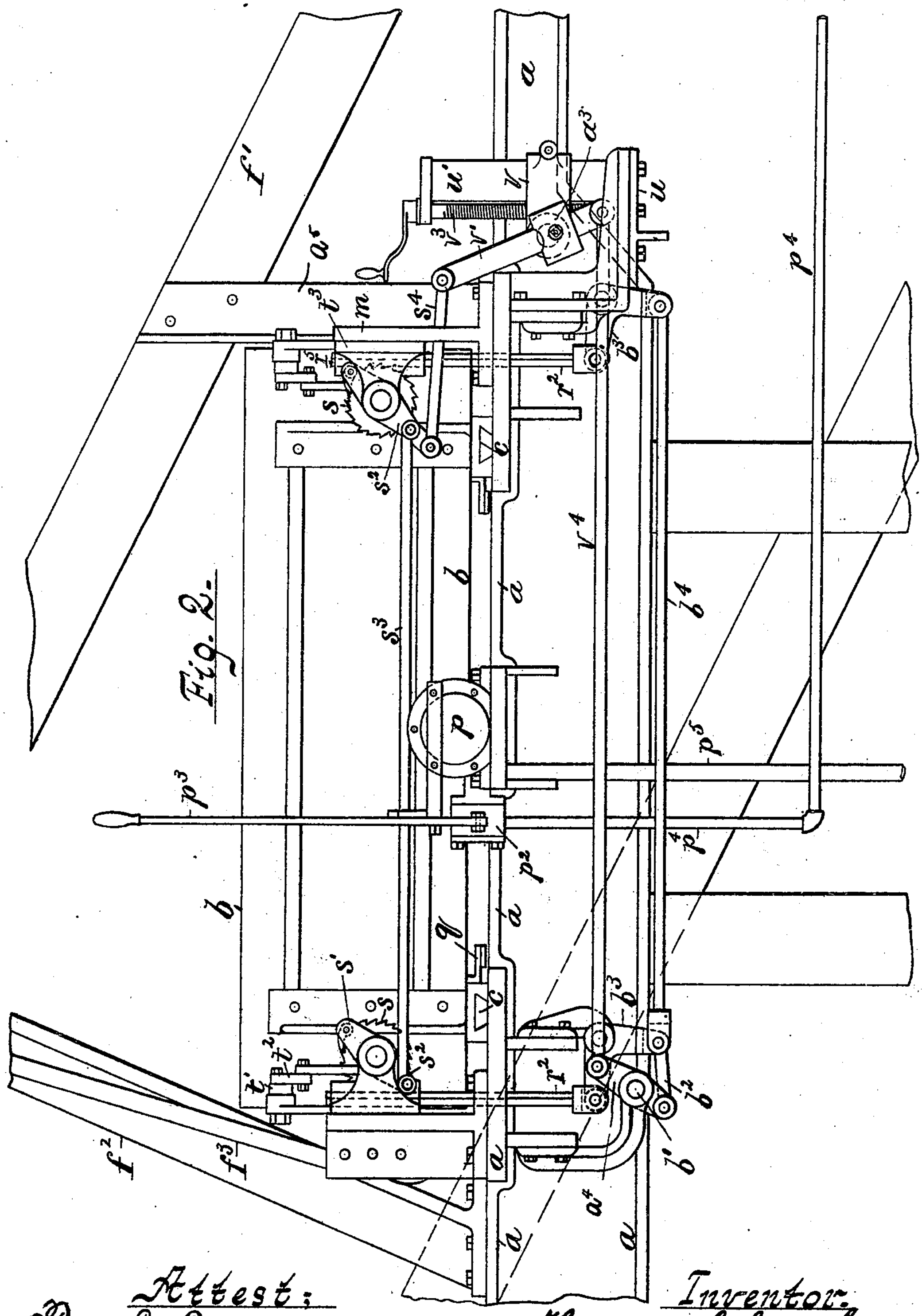

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MACHINE FOR CUTTING LUMBER.

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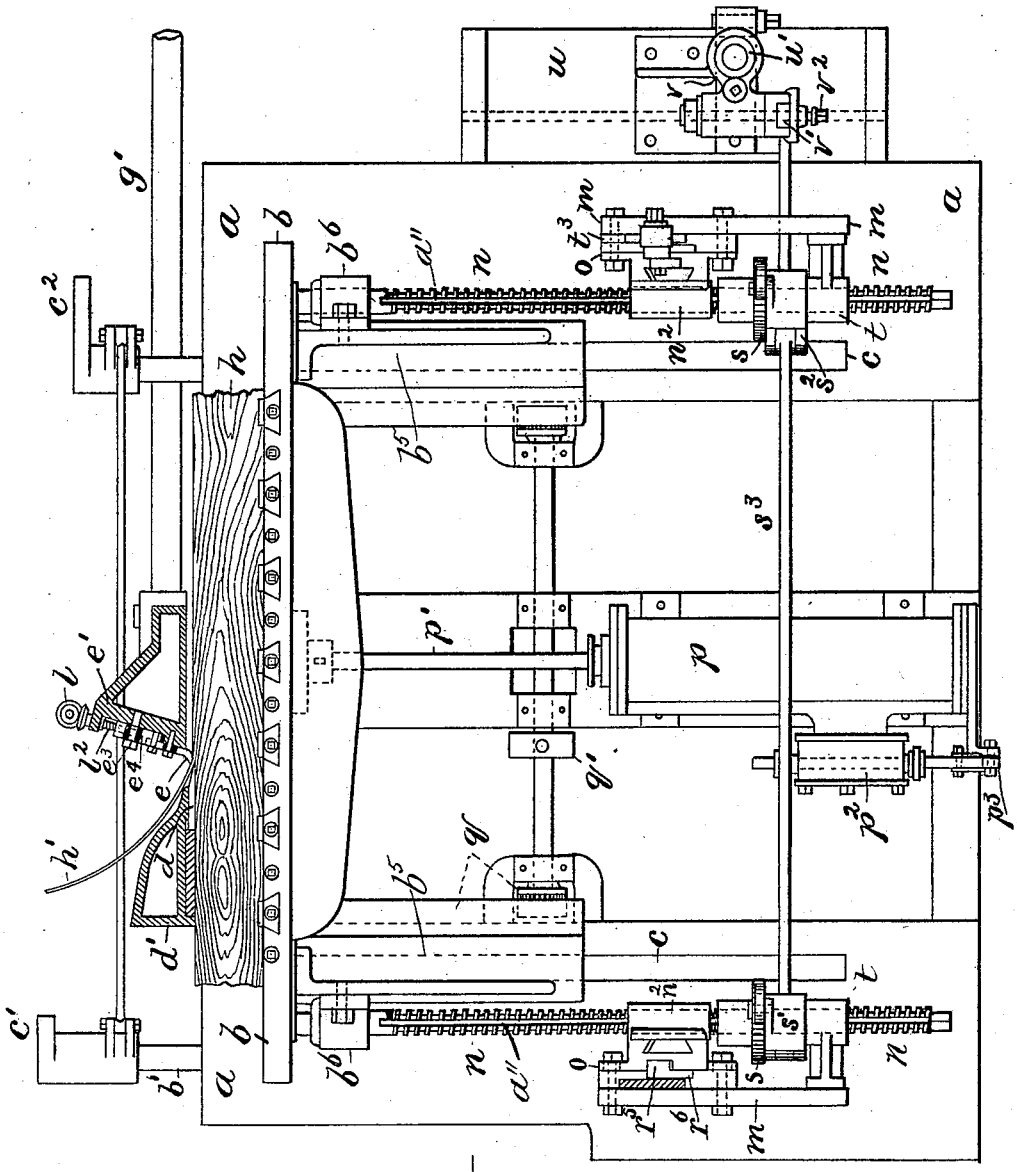

Fig. 3.

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MACHINE FOR CUTTING LUMBER.

No. 342,939. Patented June 1, 1886.

Fig. 4.

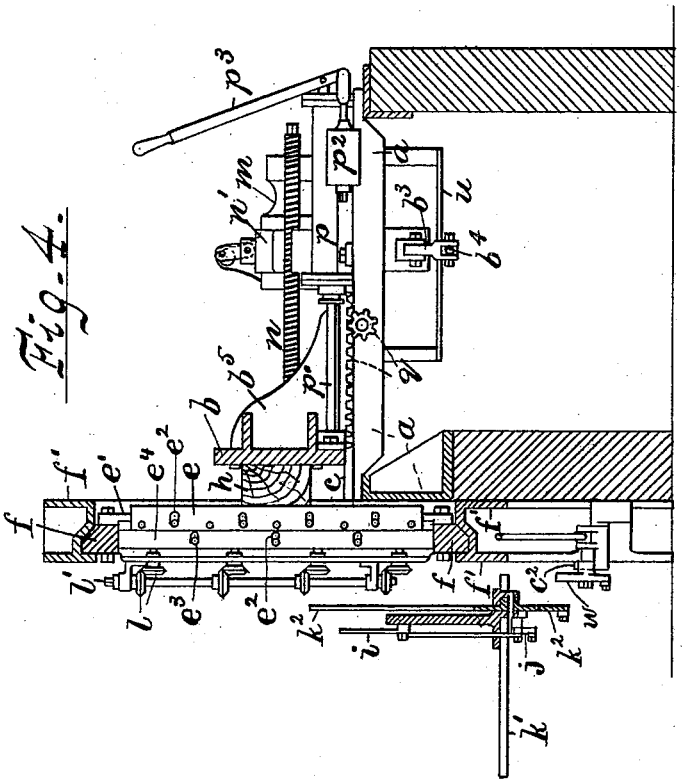


Fig. 10.

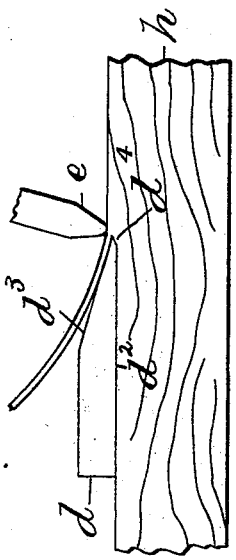
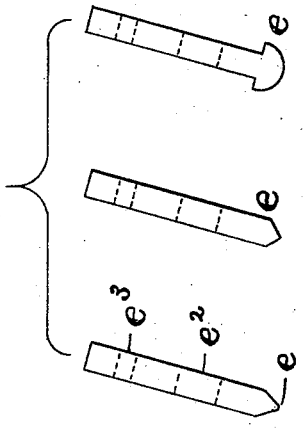


Fig. 5.



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MACHINE FOR CUTTING LUMBER.

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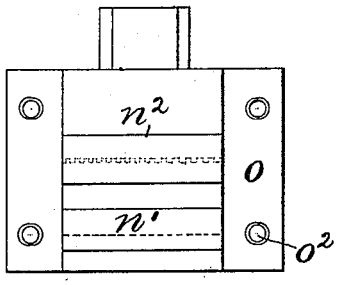

Fig. 9.

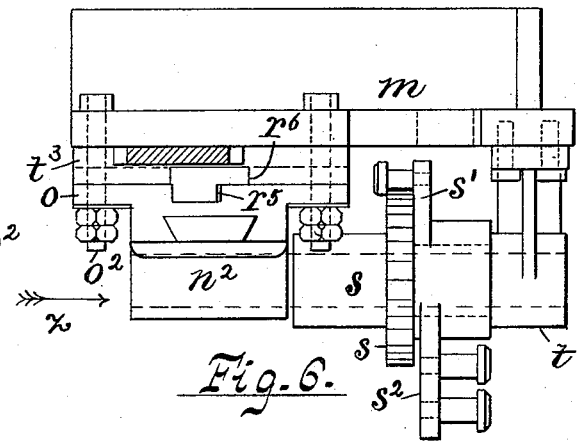

Fig. 6.

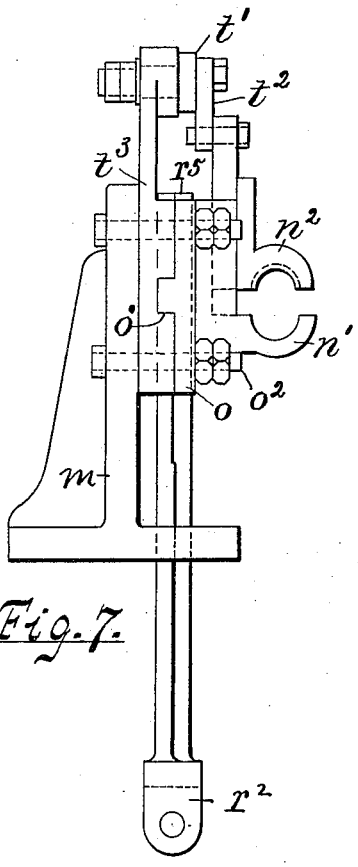

Fig. 7.

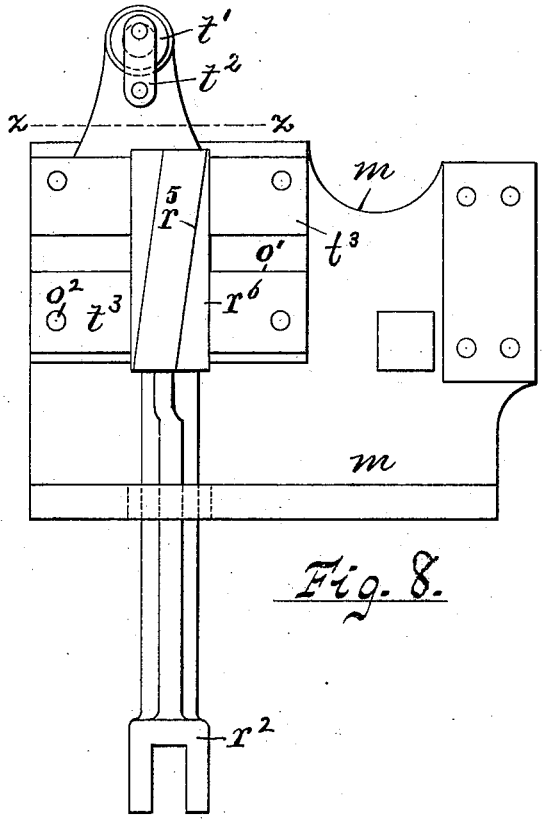

Fig. 8.

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UNITED STATES PATENT OFFICE.

HEMAN S. SMITH, OF BROOKLYN, NEW YORK.

MACHINE FOR CUTTING LUMBER.

SPECIFICATION forming part of Letters Patent No. 342,939, dated June 1, 1886.

Application filed November 23, 1885. Serial No. 183,721. (No model.)

To all whom it may concern:

Be it known that I, HEMAN S. SMITH, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for Cutting Lumber; and I do 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 the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in machines for cutting lumber, the object being to so construct the machine as to render it capable of cutting veneers and boards having any desired degree of thickness, to perform such cutting with great rapidity, and to act automatically during the entire operation of dissevering a log.

Hitherto it has been customary in cutting veneers, boards, or lumber to so construct the machine as to pass the knife across the log, the edge of the knife traveling either in the direction of the grain of the log or at right angles thereto; but both of these methods have been attended with many well-known difficulties—such as breaking, cracking, or shaking the wood—all of which it is the object of my improved machine to overcome; for I so situate the traveling knife with reference to the log that it shall not strike it lengthwise, since such a stroke has in many previous machines resulted in the injury or demolition of the machinery, nor yet to strike the log endwise, since this often cracks, breaks, or otherwise injures the wood; but the knife is situated so as to meet the log cornerwise, entering it by degrees with a direct diagonal cut, the edge of the knife being diagonal to the grain of the wood. This gradual entry of the knife into the wood obviates the shock which is incident to the meeting of an entire knife-edge and a lengthened log, and it causes the board which is cut to roll off the log with ease as the knife travels onward through it, always keeping its edge diagonal to the grain, and at length passing from the log at the corner opposite that which it entered.

Therefore my invention consists in a steam-actuated reciprocating knife-carrier, presser-bar holder and connections, an automatically-operated valve mechanism for reversing the movements of the piston, mechanical appliances whereby the valves may be shifted by hand in such manner as to allow the piston to be stopped or started at any point in the length of its stroke, an automatically-operating feeding device and its accompaniments, and suitable means for retracting the log from the knife after each cut, in order to clear the knife on its return-stroke; and the invention further consists in certain peculiarities of the construction and arrangement of parts, as will be hereinafter fully set forth.

In the annexed drawings, illustrating my invention, Figure 1 is a front elevation of the entire machine. Fig. 2 is a rear view of the machine, showing the feeding mechanism. Fig. 3 is a top plan view of the same, and showing in section the knife and carrier in conjunction with a log which is being cut. Fig. 4 is a cross-section through the machine on the line *x x* of Fig. 1. Fig. 5 is a diagram showing three different forms for the operative edge of the presser-bar. Figs. 6, 7, 8, and 9 are detail representations of the log feeding and retracting mechanism; and Fig. 10 is a view showing the knife in action on a log.

Like letters of reference designate like parts in the several views.

a represents the bed-plate of the machine, constructed in any approved and desirable form, and so situated with reference to the other parts of the machine as will best serve its purposes.

b is the stay-log, movable upon the horizontal bed-plate. In front of the bed-plate and placed obliquely thereto are ways *f' f'*, firmly secured in position, within which slides the cross-head carrying the knife and presser-bar devices in a direction diagonal to the longitudinal axis of the log *h* upon the bed-plate.

g represents a steam-cylinder, so located that its axial line passes midway between the guiding-ways *f' f'*, and which is provided with a steam-piston attached to a rod, *g'*, which latter is keyed into the presser-bar holder *e'*. The head-block to be used in my machine is shown in Figs. 1 and 2, and is designated by

a^5. The steam-cylinder g is also provided at each end with steam-chests g^3, which are connected by a steam-supply pipe, g^2, into which passes the steam coming direct from the boiler, and to one side of the cylinder g is secured another smaller cylinder, c^2, containing a steam-piston connecting with and actuating a main valve-stem, g^4. This latter cylinder is provided with a valve-chest, c^3, containing a slide-valve, which is operated by a rod, r. The valve-stem g^4 passes entirely through the steam-cylinder c^2, and extends in either direction until its opposite ends enter the steam-chests g^3 g^3, and are attached to valves within said chests, which valves are used to admit steam alternately to opposite ends of the cylinder g, and to discharge it from the same cylinder upon the return-stroke, into an exhaust-pipe, g^6, extending between the two steam-chests g^3.

The cross head which slides between the inclined ways f' f', as represented in Fig. 1, is composed of a knife-carrier, d', and a presser-bar holder, e', the knife-carrier being provided with a knife, d, and the holder carrying a presser-bar, e. The relative arrangement of the several parts of the cross head is shown in section in Fig. 3. Secured to the holder by means of bolts e^3 is an adjustable plate, e^4, to which is attached the presser-bar e, and the adjusting of the plate is accomplished by a series of screws, b^2, passing through a flange projecting from the holder, their outer extremities being provided with bevel-gears, which mesh with bevel-gears l upon a shaft, l'. (See Fig. 4.) Both the adjusting-plate e^4 and the presser-bar e are provided with slots e^2, through which the bolts e^3 pass, for the purpose of securing the plate to the holder, as also the bolts for securing the presser-bar to the holder. Therefore by the rotation of the rod l' the presser-bar may easily be set at a greater or less distance from the edge of the knife. The cross-head thus composed is provided with side bars, f f, fitted to the ways f', as shown in Fig. 4, one of the said bars—as the upper one, for instance—having preferably roller-dogs adjustably secured thereon, which are adapted to automatically engage and operate the valve-connections, while the other of the bars, as the lower one, is provided with devices for automatically engaging and controlling the feed-connections.

Near each end of the upper one of the ways f' is pivoted a trip-lever, r', the two being connected with one another by a rod, r^7. The lowermost of these trip-levers connects by a rod, r^8, with a bell-crank, r^4, pivoted in suitable position upon a part of the frame-work of the machine, and provided in turn with a rod, r, which actuates the slide-valve within the valve-chest c^3.

An operator's platform, k, located wherever it is most convenient to have it, but in the drawings shown in proximity to the front of the machine, has mounted upon it a stand for holding the two lever-handles i and k^2. The handle i governs the admission of steam to the main cylinder by connecting through rods and a bell-crank, j, with a valve located in the main steam-supply pipe g^2. The handle k^2 is pivoted to a rod, which, through the medium of appropriate levers, as k, shifts the valve-stem g^4 when desired, so as to stop the cross-head at any point in the stroke of the knife.

The admission of steam to the cylinder allows it to act directly upon the piston, and the cross-head is thus reciprocated between the ways. When it arrives at the upper limit of its stroke, the roller s engages the upper trip-lever r' and motion is imparted through the intermediate leverage and connecting-rods to the slide-valve within the chest c^3, which valve is shifted, so as to admit steam to the cylinder c^2, in such manner as to shift the valve-stem g^4, thereby causing the valves within the chests g^3 to admit steam to the main cylinder, so that the motion of the cross-head will be reversed and it will descend. When it reaches its lowest limit, one of the rollers s will engage the lower trip-lever r', and the motion of the piston and cross-head will again be reversed in a manner similar to that just described. Thus there will be a constant reciprocating motion given to the cross-head when once the steam has been admitted to the main cylinder; but we have already seen that the operator has at his command means for shifting by hand the valve-stem g^4. He can therefore at any time accomplish, by means of the hand-lever, the same reversal of motion in the cross-head that is effected automatically by the cross-head itself through the interaction of the roller-dogs, trip-levers, &c. He has the machine entirely under his control at every instant, and can start or stop the knife at any point.

Upon the bed-plate a are situated the devices for feeding the log forward to the knife. The stay-log b is provided with brackets b^5, (see Figs. 3 and 4,) fashioned on their under side with grooves, which inclose tongues c, projecting from the surface of the bed-plate, in order that the stay-log may be thereby guided in its movements backward and forward. These brackets or braces b^5 have bolted to their sides longitudinal gear-racks q. A shaft carrying pinions on either end, which engage with the racks q, is located transversely to the bed-plate, and is provided with a disk, q', with which a hand-lever may be used to move the stay-log independently of all other means. The provision of the racks and pinions also insures a steady movement of the stay-log at all times, and prevents one end from moving faster than the other.

The mechanism whereby the reciprocation of the cross-head automatically governs the feed will now be described. Feed-screws n n (see Fig. 3) are arranged above the bed-plate, their one end being upheld by boxes or holders b^6, secured to the brackets b^5, which ends bear against the stay-log, so that the rotation of the screws will feed the latter forward, while the other ends of the feed-screws are upheld

by being journaled into holders t, secured to upright plates m, rigidly mounted upon the bed-plate. Each feed-screw also passes through, and is further upheld by means of a bisectional journal-box having a removable upper half or nut, n^2, screw-threaded to fit the feed-screw, and this nut in this connection serves to keep the feed-screw in the position in which it is placed by the automatic mechanism. The nut n^2 is affixed to the upright plate m in a manner to be presently described, and between the terminal holders b^6 and t. Upon the feed-screws, preferably between the bearings t and the nuts n^2, are loosely mounted ratchet-wheels s, bored to fit the outside of the screws, and provided with an inner projecting lug or key, which fits into a longitudinal groove, a'', in the feed-screw. Between the wheels s and the bearings t are situated levers s', also fitted loosely upon the feed-screws and provided at their upper ends with pawls adapted to engage the teeth of the wheels s, the lower ends, s^2, of the levers being coupled by a cross-rod, s^3, so that they may operate simultaneously. A rod, s^4, is pivoted to the lower end of one of the pawl-carrying levers and connects it with a lever, v', having an adjustable fulcrum, v, and actuated by means of a rod, v^4, as will be presently shown. The fulcrum v consists of a sleeve movable up and down upon a smooth cylindrical column, w', which sleeve has a socket, a^3, pivoted thereto, and playing upon the lever v', which is clamped in said socket by a set-screw, v^2. The fulcrum v is adjusted to any desired point upon the lever v' by means of a screw, v^3, journaled in suitable bearings and passing through the said fulcrum, so that its rotation will elevate or depress the same. Thus it is evident that the operator may at pleasure adjust the leverage which communicates motion to the ratchet-wheels, so as to vary the thickness of the cut of the knife.

In order to operate the feeding device the lower way, f', is furnished with pivoted arm c^4, connected together by a rod, c^6, and during the movement of the cutter intermittently brought into contact with and moved, the one by the dog a' and the other by the dog a^2, which dogs project from the lower side bar, f, of the cross-head. One of the arms c^4 is secured upon the end of a rock-shaft, b', which passes underneath the bed-plate of the machine, its other end being journaled in a suitable bearing and provided with a small double lever, a^4, to the upper end of which is connected the rod v^4, above mentioned. It is obvious, then, that when the cross-head strikes the upper arm, c^4, at the end of each return-stroke, before the cut begins, motion will be imparted through rock-shaft b', levers a^4, rod v^4, and levers v' and s^4 to the pawl-carrying levers s', whereby the pawls which they carry, being now in one of the interdental spaces of the ratchet, will act against the adjacent tooth of the same, rotate the feed-screw and feed forward the log. The cross-head on its downward stroke will also strike the lower arm, c^4, thus causing the pawls to slip over the ratchet-teeth into another interdental space and be ready for action as before.

It becomes desirable in machines of this character to avoid the friction of the knife against the log when the cross-head is on its return-stroke. In order to accomplish this I have devised means for automatically retracting the log, so that it may lie clear of the cross-head in its upward motion, and this mechanism is actuated by the contact of the cross-head with the lower lever, c^4, in like manner with the actuation of the feeding device proper. The lower lever, c^4, is connected with upper lever, c^4, which has been described as being secured to one end of a rock-shaft, whose other extremity carries a double lever-arm, a^4, the upper end of which connects with the rod v^4, for actuating the feed. Now, the lower end of lever a^4 has a short lever, b^2, which connects with and operates a bell-crank, b^3, one arm of which is pivoted to a rod, r^2, to which it imparts a vertical oscillation, and the other arm being pivotally connected with a connecting-rod, b^4, extending to a spot under the opposite side of the bed-plate, where a similarly-situated bell-crank is located, one arm of which latter bell-crank is pivoted to the said rod b^4, while the other carries a vertical rod, r^2. These rods r^2 extend up through the bed-plate alongside of the vertical plates m m. Each stand or plate m has another plate, t^3, secured to its inner face by means of screws or bolts o^2, which latter plate is provided with an upper extension affording a bearing for the rotary crank t', and also with a horizontal groove, o', as shown in Fig. 8. Stands m are also provided with vertical grooves r^6. Within the horizontal groove o' is fitted movably a casting, o, having a horizontal flange which enters the said groove, said casting being slotted so as to slide upon the bolts o^2, which serve to secure it, as well as the plate t^3, to the stand m; and, further, the casting o is provided on its rear side with an inclined groove lying directly opposite the vertical groove in the plate t^3. The stand m has already been described as serving to support a bisectional journal-box through which the feed-screw passes. The sections of this box are designated by n' and n^2. The lower section, n', is affixed rigidly to the casting o, and is formed with its interior surface smooth. The upper section or half, n^2, is screw-threaded to fit the thread of the feed-screw n, and this section is provided with a dovetailed flange which fits into a dovetailed groove in the face of the casting o, as shown in the plan detail, Fig. 6. The section n^2 is therefore susceptible of vertical movement, which allows it to be taken off the feed-screw or replaced thereon, and this movement is generally effected by a link, t^2, coupled to the section n^2 and actuated by the rotary crank t'. Now, the rods r^2 above referred to are formed upon their upper ends with a slide, r^6, which is provided with an inclined tongue, r^5.

This slide and tongue enter, respectively, the vertical groove upon the casting t^3 and the inclined groove upon the casting o; and the effect of the vertical oscillation of the rods r^2, which, as has already been described, takes place, will be to cause the casting o and the nut n^2 and section n', which said casting carries, to move horizontally backward or forward from the cross-head; but since the nuts n^2 engage the feed-screws, the backward and forward movement of the nuts will carry the screws with them, and consequently the stay-log and also the log. Thus it will be seen how these several mechanical agencies combine to effect an automatic intermittent retraction and protrusion of the log when the cross-head comes into contact with the arms c^4.

Let us now suppose that a log has been fed forward until it has been completely cut into boards. Some more expeditious means than the hand-lever and rack and pinion are obviously desirable to replace the heavy stay-log in position to feed forward the next log. Therefore I find it convenient to provide a steam-cylinder, p, situated upon the bed-plate and containing a piston with which is connected a rod, p', keyed or otherwise fastened to the stay-log. This cylinder is provided with a chest, p^2, containing a valve which is moved by a hand-lever, p^3. All that is necessary, therefore, after a log has been completely cut is to lift the nuts n^2 off the feed-screws and then, by grasping the lever p^3, admit steam to the cylinder, so that it may act upon the piston and return the stay-log to a position to be again fed forward. The nuts n^2 are then placed again in position and the cutting of the new log proceeds. The distance which the log is fed forward by the automatically-operated feed mechanism is somewhat greater than the distance between the foot of the presser-bar and the knife-edge, so that the presser is thereby made to bear upon the log with very great force. This prevents the fibers from splintering or cracking, and keeps the wood sound while being cut.

In Fig. 3 the presser is shown as curved, and in Fig. 5 is given a diagrammatic representation of several forms of the presser-foot. The character of the wood on which it is to be used determines which is most suitable, and obviously the presser-bar may be made in any one of numerous forms, it being only essential that it be of a form which will allow it to press firmly and rigidly against the wood near the cutting-point in such a manner as to accomplish the desired result, which will necessarily involve the presser-foot's being somewhat curved, to prevent the wood breaking—that is to say, the presser-foot must be formed so that the strip which is being cut cannot bend up quickly from the log as it leaves the same, for this would split, break, check, or otherwise injure the strip or wood; but the foot must be so formed that it will graduate the bend of the resulting strip to an easy curve from the log outward between the presser-foot and the knife, ultimately allowing it to emerge as a straight, even, and sound board. Thus it will be seen that the knife enters compressed wood, the wood being so compressed by the bar or roller which rides on the wood slightly in advance of the cutter, and the strip is held compressed between the face of the knife and the presser-foot until the compression is relaxed by the emergence of the board or strip from between them, when this strip expands to the width it would have had if uncompressed. In a word, it may be said that by my improved machine a perfectly sound board is cut by firmly compressing the wood during the cutting operation and then allowing it to expand from this unnatural condition of fibrous cohesion to the perfectly natural and normal state of wood as it exists in the growing tree or the hewn log. This temporary compression, therefore, does not injure the fiber any more than it would be injured by sawing the log, and untold advantages result.

In Fig. 10 is delineated the form of knife which I preferably use, and which may, if desired, dispense with the necessity of a separate presser, since knife and presser itself are combined in one device. It has a flat face, d^2, pressing hard against the wood, and a beveled face, d^3, which separates the board from the log, the flat face d^2 being slightly sloped or beveled, as at d^4, toward the face d^3, to form the cutting-edge. Such a cutting-edge obviously tends to ride upon the surface of the wood when in operation, and must be rigidly held and guided, so as to compress the wood adjacent to its inner side during each cut, the next succeeding cut removing such compressed wood more perfectly than if uncompressed. A presser-bar or a roller is generally used in connection with this style of knife, especially in cutting cross-grained wood.

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

1. In a lumber-cutting machine, the combination of a knife-carrier sliding in ways and provided with outwardly-extending projections, a steam-cylinder containing a piston whose piston-rod is attached to the knife-carrier, and trip-levers pivoted upon the upper one of the ways in the path of the projections upon the moving carrier, said trip-levers connecting together and with the valve mechanism of the steam-cylinder, so that the actuation at proper intervals of the trip-levers by the projection on the carrier will regulate the steam-supply for reciprocating the latter, substantially as shown and described.

2. In a lumber-cutting machine, the combination of a knife-carrier sliding in inclined ways and provided with projections extending over the upper way, a main steam-cylinder containing a piston whose piston-rod is connected with the said cross-head, valve-chests located on each extremity of the main cylinder, a supplemental steam-cylinder attached to the main cylinder and carrying a valve-

chest, a valve-stem passing through the supplemental cylinder and having its ends attached to the valves contained within the chests of the main cylinder, and means for automatically regulating the steam-supply, so as to reciprocate the cross-head, which consists of trip-levers pivoted upon the upper of the ways and connecting with each other and with the valve in the chest of the supplemental cylinder by suitable levers, which trip-levers lie in the path of the projections upon the cross-head and are actuated thereby, substantially in the manner shown, and for the purposes set forth.

3. In a lumber-cutting machine, the combination of a carrier for the knife sliding in inclined ways, a main steam-cylinder containing a piston whose piston-rod is connected with the said cross-head, valve-chests located on each extremity of the main cylinder, a supplemental steam-cylinder attached to the main cylinder, a valve-stem passing through the supplemental cylinder and having its ends attached to the valves contained within the chests of the main cylinder, and means for shifting the valve-stem by hand in order to control the movement of the cross-head at any point in the length of its stroke, which consists of a hand-lever connected by suitable rods and levers with the said stem, substantially as herein specified and shown.

4. In a lumber-cutting machine, the combination of a cross-head sliding in inclined ways and provided with projections extending over the face of the upper way, a steam-cylinder containing a piston whose rod connects with the cross-head, automatic mechanism for reciprocating the cross-head, consisting of pivoted trip-levers secured upon the upper way in the path of the projections on the cross-head, which levers connect with the valve mechanism of the cylinder, and with which levers the projections come into contact, and means consisting of a hand-lever and rods for connecting the same with the valve-stem, whereby the valve mechanism is shifted by hand so as to stop the cross-head at any point in the stroke, substantially as shown and described.

5. In a lumber-cutting machine, the combination, with a knife-carrying cross-head reciprocated by the direct action of steam upon a steam-piston inclosed within a steam-cylinder and a valve mechanism for regulating the steam-supply to effect such reciprocation, of a hand-lever and rods connecting the same with the valve-stem to shift it, and a hand-lever and rods connecting the same with the valve in the steam-supply pipe for controlling the admission of steam to the cylinder, so that by the conjunct manipulation of the two hand-levers the cross-head can be governed at all points throughout the length of its stroke, substantially as represented and herein specified.

6. In a machine for cutting lumber, the combination, with a reciprocating cross-head, and pivoted levers c^4, intermittently moved by it, of the rock-shaft b', carrying at one extremity the upper lever, c^4, and at the other a double lever, a^4, the connecting-rod V^4, and a system of levers for operating the feed, one of which levers is provided with a movable fulcrum, whereby the feeding mechanism is rendered adjustable for any thickness of board to be cut, said fulcrum consisting, essentially, of a socket inclosing the lever, which socket is pivoted to a sleeve adjustable upon a vertical column, substantially as shown and set forth.

7. In a machine for cutting lumber, the combination of the standards m, plates t^3, and castings o, having rear flanges working in grooves o' on the plates t^3, and carrying journal-boxes for the feed-screws, all of which parts are combined together by means of bolts o^2, passing through slots, as shown, and are rendered horizontally movable together with the feed-screws by means of vertically-oscillating wedges actuated by a leverage connection automatically acted on by the reciprocating carrier, substantially as shown and described.

8. In a lumber-cutting machine, the following elements in combination, viz: the inclined ways, the cross-head sliding therein and carrying a cutter located transversely to the ways, the steam-cylinder containing a steam-piston whose piston-rod is secured to the cross-head perpendicularly to the cutter, valve-chests situated on each end of the cylinder, a supplemental cylinder secured to the side of the main cylinder, and a valve-stem within the supplemental cylinder, whose extremities are connected with the valves in the chests of the main cylinder, so that the admission of steam to the supplemental cylinder will shift the valve-stem and reciprocate the cross-head, substantially as shown and described.

9. In a lumber-cutting machine, the automatic mechanism for shifting the valve-stem and reciprocating the cutter at each end of the stroke, which consists of pivoted trip-levers r' r', adapted to be brought alternately into contact with the cross-head, said levers being connected by a rod, r^7, the rod r^3, pivoted to a bell-crank, r^4, which actuates a rod, r, and thereby moves a slide-valve in the chest c^2, and admits steam to the cylinder c^3, to shift the stem g^4, substantially as shown and described.

10. In a machine for cutting lumber, the combination, with the stay-log, of horizontal feed-screws n n, journaled in suitable holders, b^6 and t, and provided with ratchet-wheels s s, mounted loosely thereon, and having interiorly-projecting lugs, which engage with longitudinal grooves in the feed-screws, which latter are further provided with levers s' s', connected together by a cross-rod, s^3, and each carrying a pawl for engaging the ratchet, said levers s' s' being moved so as to feed the log forward by means of a leverage connection automatically acted on by the knife-carrier, as shown and set forth.

11. In a machine for cutting lumber, a retracting mechanism for withdrawing the log

after each cut, which consists, essentially, of bisectional holders for the feed-screws, the lower section being smooth, while the upper section is screw-threaded to fit the screws, and is rendered immovable therefrom by being provided with a rear flange, which works in a groove in a horizontally-movable casting, and of vertically oscillatory wedges which enter inclined grooves in the said castings and are actuated to move the holders and their accompanying feed-screws, stay-log, and log by means of levers intermittently operated by the reciprocating cutter, substantially as shown and described.

12. In a machine for cutting lumber, the combination, with the feed-screws of a feeding mechanism, of boxes fashioned interiorly so as to engage the contained feed-screws, which boxes serve to hold the feed-screws in any position in which their governing mechanism may place them, and which boxes are themselves horizontally movable in conjunction with the feed-screws to which they are connected, so as to change the position of the feed-screws and thus retract the log, substantially as shown and set forth.

13. In a machine for cutting lumber, the combination, with the feed-screws, of bisectional journal-boxes, whose lower sections are smoothly bored and mounted on a suitable standard, and whose upper sections have a screw-threaded interior for engagement with the screws, and are removable from the screws by being provided with a dovetailed flange working in a dovetailed groove formed in the supporting-casting, as shown, and for the purposes set forth.

14. In a machine for cutting lumber, the combination of the ways f' f', provided with levers c^4, connected by a rod, c^6, and a cross-head reciprocating between said ways and having its lower side bar provided with dogs a' and a^2, which intermittently come into contact with the said levers c^4, for the purpose of automatically actuating the stay-log, as shown and described.

15. In a machine for cutting lumber, the combination, with a reciprocating cross-head and pivoted levers c^4, intermittently moved by it, of a rock-shaft, b', carrying at one extremity the upper lever, c^4, and at the other a double lever, a^4, by means of which rock-shaft motion is imparted to the bell-cranks b^3, connecting with each other and the lever a^4 by means of suitable rods and levers, and each actuating a wedge-carrying vertical rod, r^2, which operates to retract the stay-log from the knife, substantially as shown and described.

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

HEMAN S. SMITH.

Witnesses:
PHILIP MAURO,
FRED E. TASKER.