No. 708,074. Patented Sept. 2, 1902.

E. POLLARD.

MACHINE FOR GROOVING LUMBER.

(Application filed Feb. 25, 1902.)

(No Model.) 5 Sheets—Sheet 1.

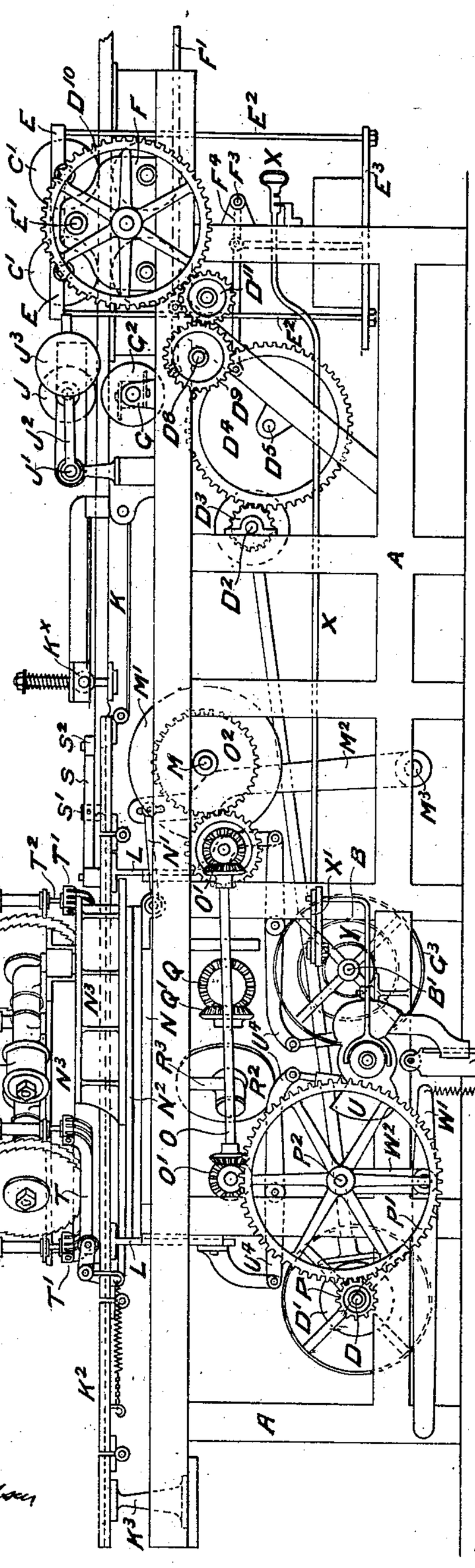

FIG. 1.

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5 Sheets—Sheet 2.

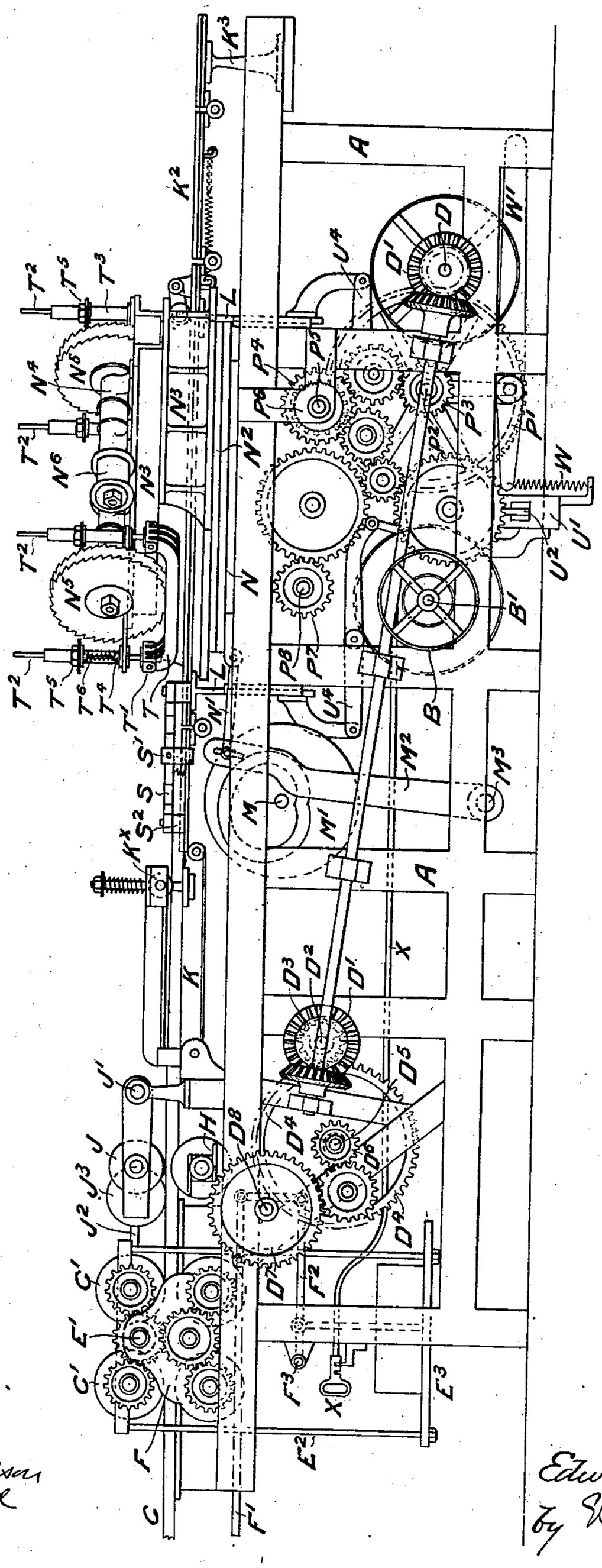

Fig. 2.

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5 Sheets—Sheet 3.

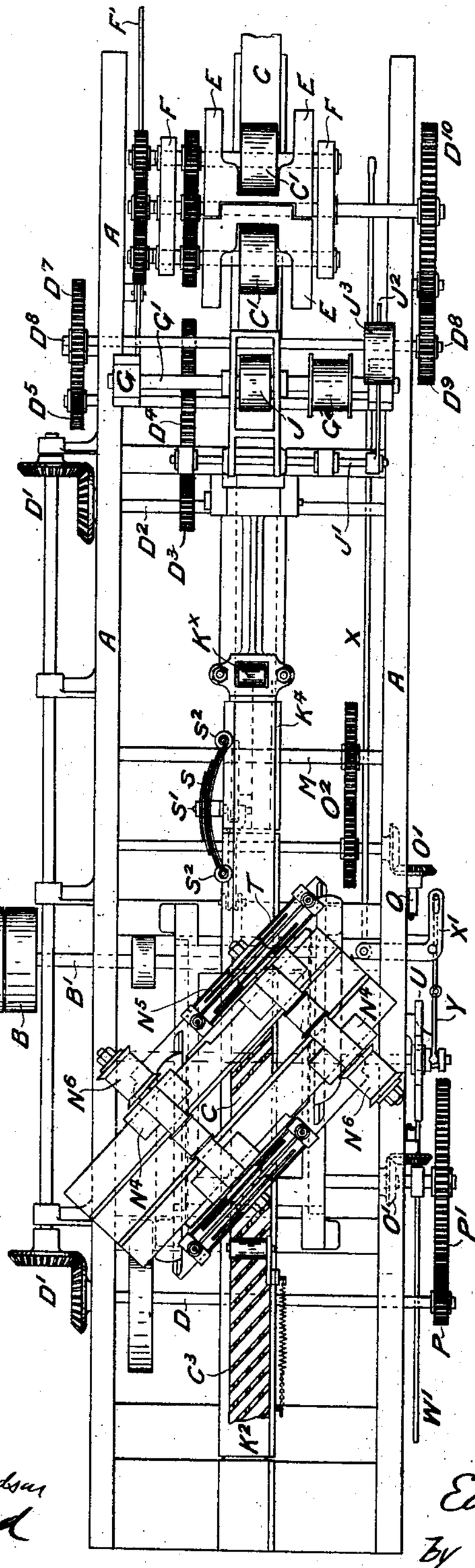

FIG. 3.

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(Application filed Feb. 25, 1902.)

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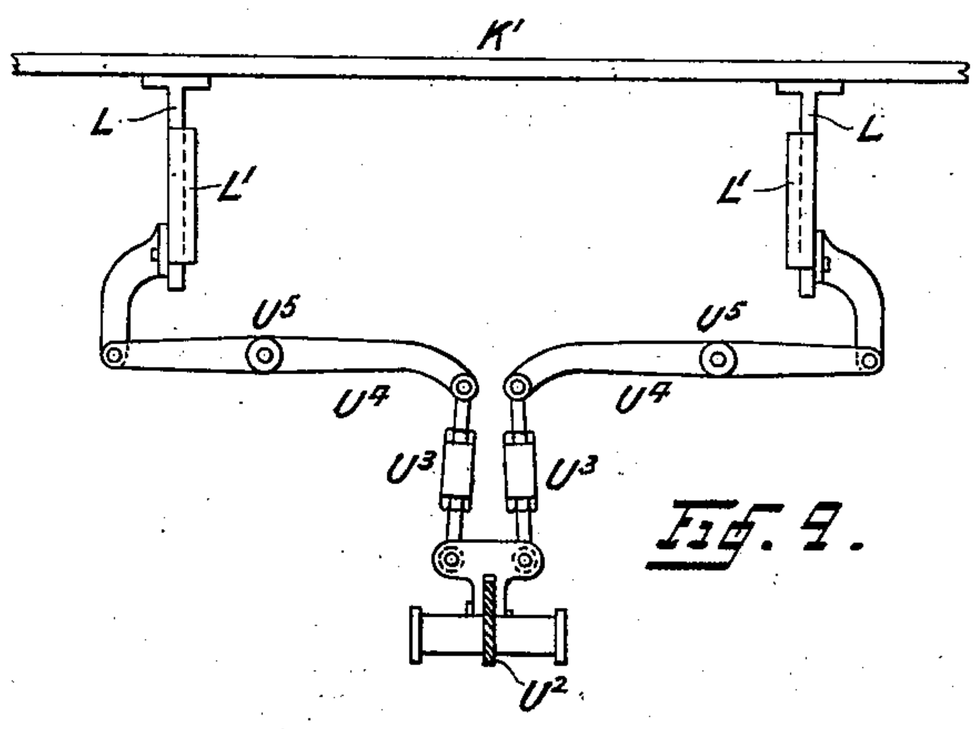

Fig. 4.

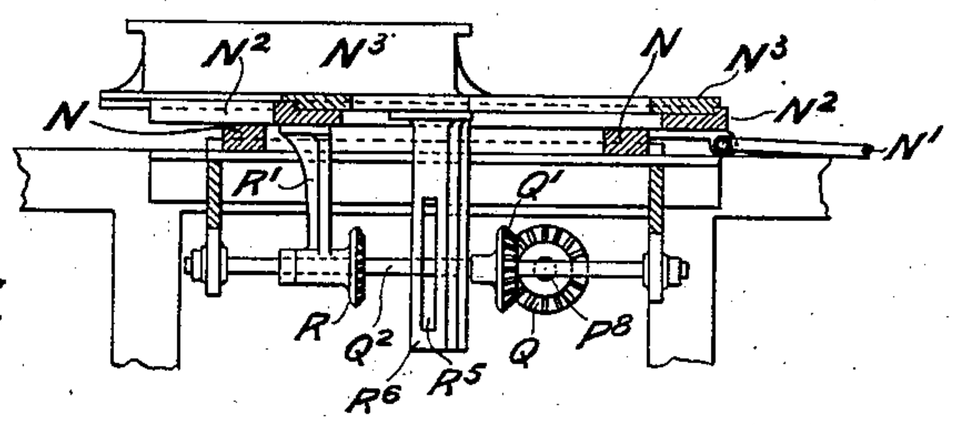

Fig. 5.

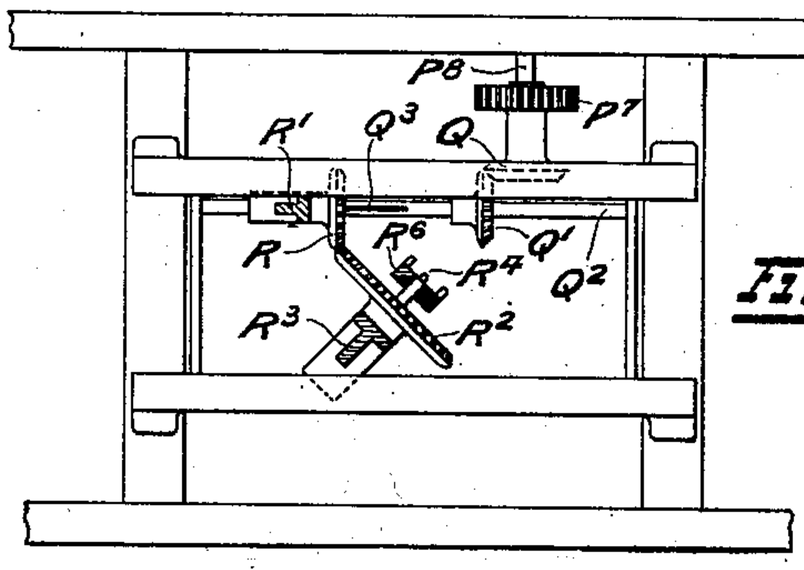

Fig. 6.

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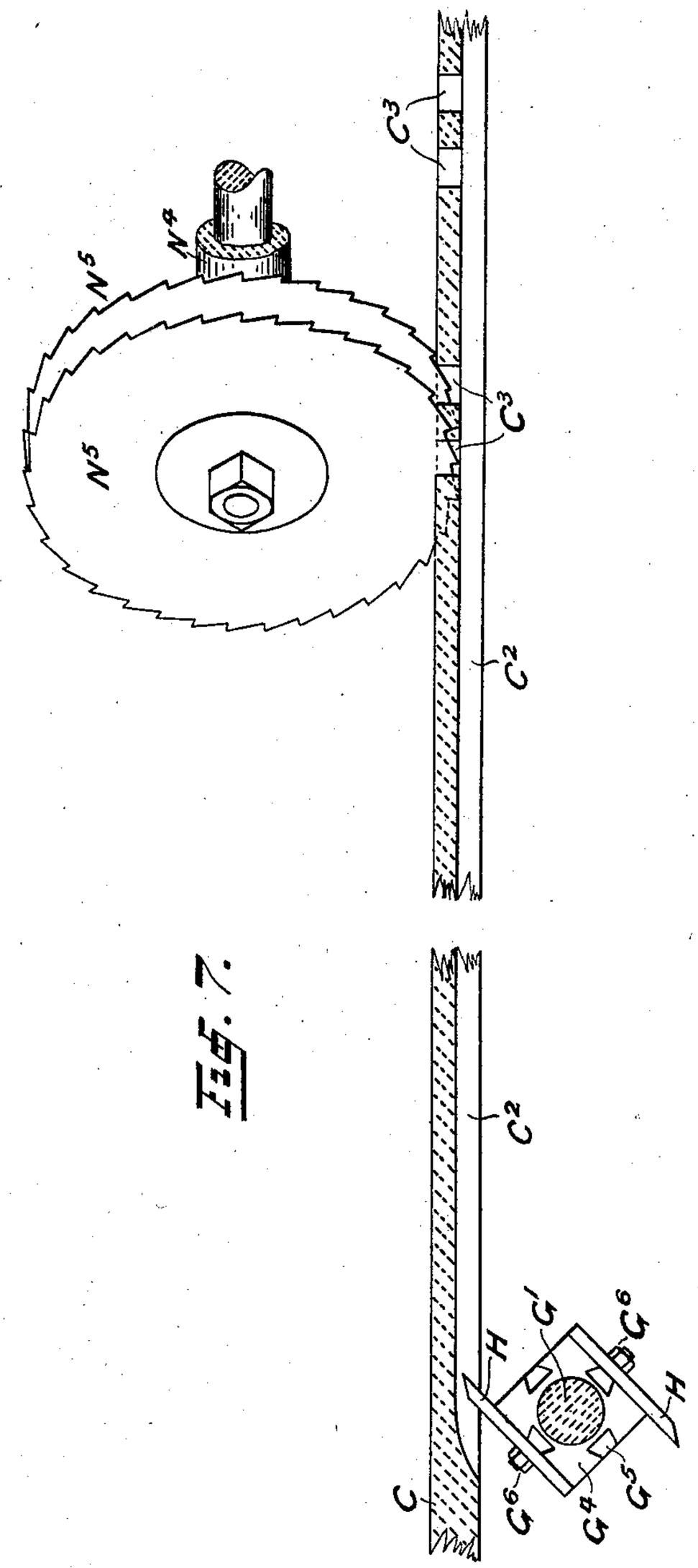
MACHINE FOR GROOVING LUMBER.

(Application filed Feb. 25, 1902.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 7.



Attest
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Inventor
Edwin Pollard
by Chas. Spear
Atty.

UNITED STATES PATENT OFFICE.

EDWIN POLLARD, OF SILSDEN, ENGLAND.

MACHINE FOR GROOVING LUMBER.

SPECIFICATION forming part of Letters Patent No. 708,074, dated September 2, 1902.

Application filed February 25, 1902. Serial No. 95,577. (No model.)

To all whom it may concern:

Be it known that I, EDWIN POLLARD, a subject of the King of Great Britain and Ireland, residing at Silsden, in the county of York, England, have invented certain new and useful Improvements in Machines for Grooving Lumber, of which the following is a specification.

My invention relates to machinery for wood-working; and it consists of a machine for grooving lumber on both sides, one set of grooves on one side intersecting the set of grooves on the other side, so that the lumber is produced as an open-work. This material I design for use as lattice-work, gratings, and floors, where the free escape of water may be desired and for other uses.

In describing my invention in detail reference is made to the accompanying sheets of drawings, in which—

Figure 1 represents a side elevation of a machine for cutting grooves on both sides of lumber. Fig. 2 is an elevation showing the opposite side of the machine. Fig. 3 is a plan. The remaining illustrations are detached details, Fig. 4 representing a section through the machine, showing the connections between tappet-shaft and means adopted for vertically operating the portion of table supporting the lumber during the transverse cuts. Fig. 5 is a sectional elevation through that portion of the machine for giving transverse movement to the circular saws for cutting the transverse grooves. Fig. 6 is a sectional plan showing the bevel-wheels and shafts for effecting the transverse cutting; and Fig. 7 is a diagrammatical view drawn to a larger scale, showing the shaft in section, to which the cutters are attached for cutting the grooves on the under side of the lumber and the circular saws for cutting the transverse grooves on the upper surface.

The operative parts of the machine are supported by suitable framework A, and motion is imparted to the machine by a pulley B, mounted on main shaft B′ of the machine, the said shaft being also provided with a loose pulley B^2.

The lumber C is fed to the rotating rollers C′ C′, driven from shaft D through the bevel-gears D′ D′, operating-shaft D^2, upon which is secured a spur-pinion D^3, gearing into spur-wheel D^4 on shaft D^5, upon which is a pinion D^6, gearing into wheel D^7 on shaft D^8, to which is also secured a wheel D^9, gearing with wheel D^{10} through intermediate pinion D^{11}, the shaft-supporting wheel D^{10} transmitting motion to the feed-rollers C′ by spur-pinions applied in the usual well-known manner. The bottom pressure or feed rollers are carried by the standards F, and the top pressure-rollers C′ are mounted in frames E, hinged on a pin E′, passing through said frames and through the standards F. The outer ends of frames E are connected by rods E^2 to a weighted platform E^3, by which pressure is given to the rollers C′ for gripping the lumber C in a manner for propelling it in the direction of arrow toward the cutting devices. The top pressure-rollers C′ can be raised to admit of the lumber being placed between the feed-rollers by operating the lever F′, which is connected to lever F^2, secured on shaft F^3, suitably carried, and upon the shaft is secured an arm F^4, from which is suspended weighted platform E^3, connected by rods E^2 to the frames E, carrying top feed-rollers C′.

Upon standards G is mounted a shaft G′, driven by pulley G^2 from pulley G^3 on main shaft B′. The shaft G′ is square at G^4 for a portion of its length. In the square portion undercut grooves G^5 are made for the reception of the heads of bolts G^6, employed for securing the cutters H, utilized for cutting the longitudinal grooves C^2 on under side of lumber C, the depth of grooves being regulated by the adjustment of the distance the cutting edge of said cutters projects beyond the square shaft, each cutter being provided with a slot for the reception of a bolt G^6 for securing the cutter H and adjustment of same for regulating depth of cut. A roller J, supported by a frame connected to shaft J′, is placed immediately above the revolving cutters H, carried by shaft G′. The roller J rests upon the upper surface of the lumber, and pressure is applied to the roller J and lumber by a lever J^2 and weight J^3. The lumber C, passing over the revolving cutters H, is grooved on the under side at C^2 and, continuing its course, passes over the hinged support K, provided with a pressure-roller $K^\times$, and to the hinged support K is jointed a table K′, the opposite end of said table being jointed to an

extension K^2, hinged to bracket K^3. The portion K′ of table is secured to the sliding bars L L, reciprocated vertically, for the purpose and in the manner as hereinafter described. The transverse grooves C^3 on the upper face of the lumber C are cut to a depth so as to intersect the longitudinal grooves C^2, thus producing lattice-work suitable for gratings and floors, where the free escape of water may be desired, and for other uses.

Upon the rotating shaft M is mounted a cam-plate M′, in the cam-groove of which engages an antifriction-bowl attached to a lever M^2, supported by shaft M^3, mounted in suitable bearings. The upper portion of lever M^2 is coupled to the carriage N by link N′ for giving a sliding motion in accordance with the cam-groove to the said carriage and parts connected or mounted thereon. Rotary motion to the cam-shaft M is transmitted by the diagonal shaft O through bevel-gears O′ and spur-gears O^2.

Upon the reciprocating carriage N, guided by ways, is bolted a plate N^2, also prepared with guiding-ways for the reception of a frame N^3, placed thereon, supporting the journals N^4 and circular saws N^5, driven by the pulleys N^6. The frame N^3 and circular saws N^5 are reciprocated transversely across the lumber C for cutting the transverse grooves C^3 on top side to a depth intersecting the grooves C^2 cut on the under side of lumber. The frame N^3, along with the circular saws N^5, supported on frame N^3, is reciprocated longitudinally by the rotating cam-plate M′, operating as before described, and is also reciprocated transversely. This transverse motion is effected in the following manner: The rotating shaft D is driven from the main shaft B′ by a belt and pulleys, and upon the shaft D is secured a pinion P, gearing into spur-wheel P′ on shaft P^2, on the opposite end of which is a wheel P^3, gearing by an intermediate wheel with wheel P^4, mounted on shaft P^5. Attached to wheel P^4 is a small pinion P^6, (shown dotted,) gearing with spur-wheel P^7, which transmits motion to short shaft P^8 through the train of spur-wheels shown in Fig. 2. The short shaft P^8 is supported in a suitable manner, and upon the opposite end of the shaft a miter-wheel Q is secured, gearing with a miter-wheel Q′, secured on shaft Q^2, grooved at Q^3 for a portion of its length for the reception of a feather-key fixed in bevel-wheel R, the boss of which is of such length as to extend through and be supported by bracket R′, secured to the reciprocating carriage N or plate N^2, bolted thereto. The bevel-wheel R gears into one, R^2, of larger diameter, supported by bracket R^3, also attached to the reciprocating carriage N or plate N^2 bolted thereto, so that these two wheels are always in gear, although the shaft Q^2 is adapted to slide through bevel-wheel R. Projecting from the face of wheel R^2 at some distance from the center of same is a pin R^4 of a length to engage with a slot R^5, formed in bracket R^6, bolted to the frame N^3, which by my combination has a longitudinal and transverse motion. The longitudinal motion is imparted by the cam-plate M′ and the transverse motion by the pin R^4, rotating and sliding in the slot R^5 of bracket R^6, thereby causing the said bracket, frame N^3, and circular saws N^5 to reciprocate transversely, the circular saws N^5 cutting transverse grooves C^3 each time they pass through the lumber C, traveling longitudinally over the table K′.

In order to keep the lumber C in position for cutting, it is held against a fence K^4 on table K′ by one or more springs S, each supported by a bracket S′, attached to the table K′. Each end of spring S is provided with a small antifriction-pulley S^2, held in contact with the edge of lumber by the said spring. The downward pressure on the lumber C is obtained by bars T, placed on each side of the circular saws N^5. These bars T are connected to blocks T′, provided with vertical spindles T^2, guided by sockets T^3, secured to the frames supporting circular saws N^5. Each spindle T^2 is provided with a collar T^4, and between the collar and cap T^5 at top of socket T^3 is a compressed spiral spring T^6, further compressed and operated in the following manner:

The lumber C is continuously fed between the rollers C′ C′, is grooved on the under side when passing over the revolving cutters H, and when the circular saws N^5 are traveling across and cutting the transverse grooves C^2 on the upper surface the table K′ is elevated for bringing the lumber to a position for transverse cutting. The rising and falling of the said table is effected by the tappet U, which on rotating depresses the plate U′. To this plate is connected a transverse lever U^2, hinged at the opposite end to the machine-framework, and at or near the center of the said lever bars U^3 are connected, arranged to couple lever U^2 to levers U^4 U^4, fulcrumed at U^5. The opposite ends of levers U^4 are connected to the sliding bars L L, each secured to the under side of the table K′ and mounted so as to freely slide in the guide-plates L′ L′, attached to the machine-framework. It will be readily understood that on the full parts of the rotating tappet U depressing the tappet-plate U′ the sliding bars L L will be moved vertically, thereby operating the table K′ and bringing the lumber C into position for being cut on the transverse movement of the circular saws N^5 in either direction, at the same time further compressing the spiral springs T^6 sufficient for holding the lumber C firm during the transverse cutting. As soon as the circular saws N^5 have passed across the traveling lumber C the table K′ is allowed to descend, where it remains until the lumber C has traveled forward the required distance ready for the return of the circular saws N^5, when the table K′ is again elevated and another series

of transverse grooves C^3 cut. The lowering of the table K′ is effected by the gravity of the said table, assisted by a spiral spring W, attached to the tappet-plate U′ and end of lever W′, suspended by a link W^2.

The rod X is connected to one arm of a bell-crank lever X′. The other arm of said lever is connected to a projection from lever Y of the first order, the opposite end of the lever Y engaging with a groove in boss of tappet U, so that on sliding the rod X the tappet U is slid on the supporting-shaft and placed in or out of gear with the small anti-friction-roller mounted on top of plate U′.

What I claim as my invention is—

1. In combination in a machine for grooving lumber, cutters for making longitudinal grooves on one side of the material, cutters for making grooves transversely on the other side of the material, said cutters being arranged to cut into the same intermediate plane and through the material at the intersection of the grooves, and feeding means substantially as described.

2. In a machine for grooving lumber, cutters for making longitudinal grooves on one side of the material, cutters for making grooves transversely on the other side of the material, said cutters being arranged to cut into the same intermediate plane and through the material at the intersection of the grooves, means for feeding and continuously propelling the lumber, and means for firmly holding or securing the traveling lumber during the longitudinal and transverse cuttings.

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

EDWIN POLLARD.

Witnesses:
JNO. GILL,
JOSEPH P. KIRBY.