No. 780,476. PATENTED JAN. 17, 1905.

S. J. BENS.

ENDLESS CHAIN SAW.

APPLICATION FILED JULY 17, 1903.

2 SHEETS—SHEET 1.

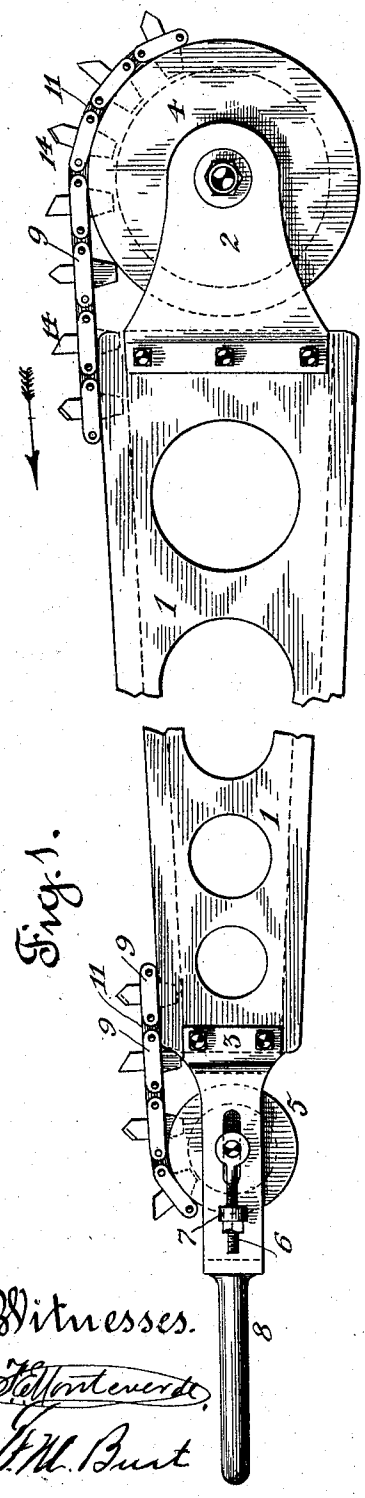


Fig. 1.

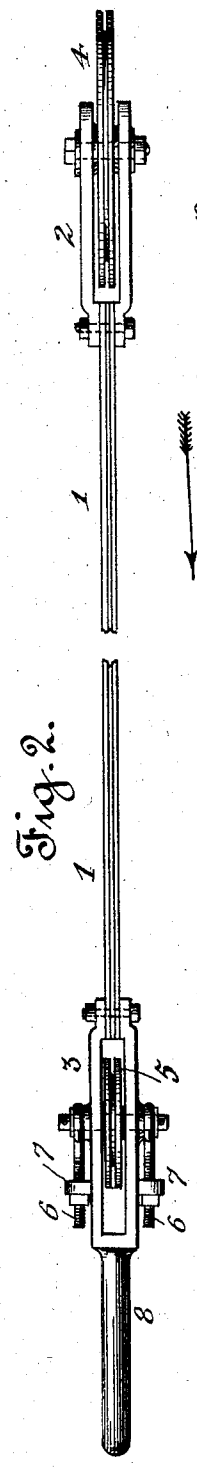


Fig. 2.

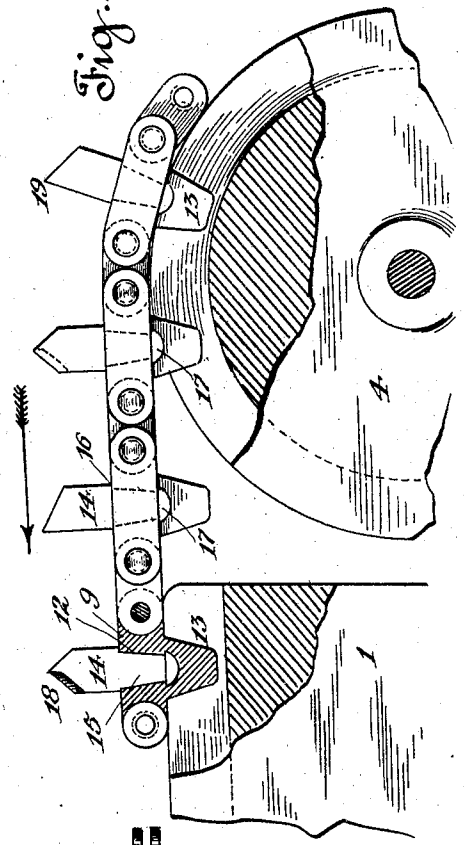


Fig. 3.



Fig. 4.

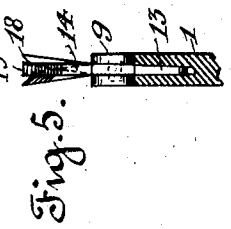


Fig. 5.

Witnesses.

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2 SHEETS—SHEET 2.

Fig. 6.

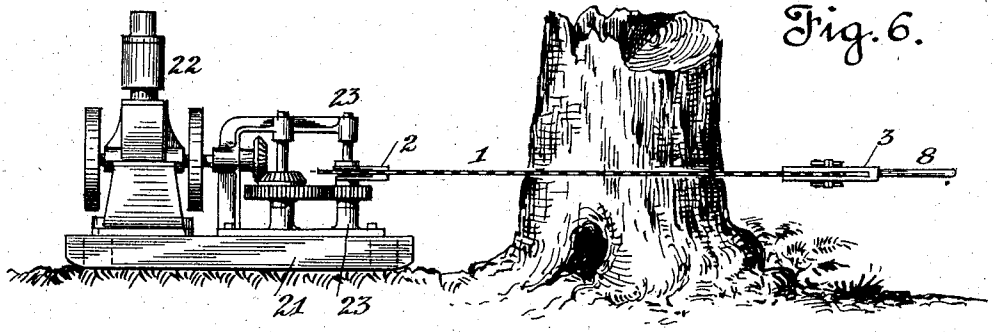


Fig. 7.

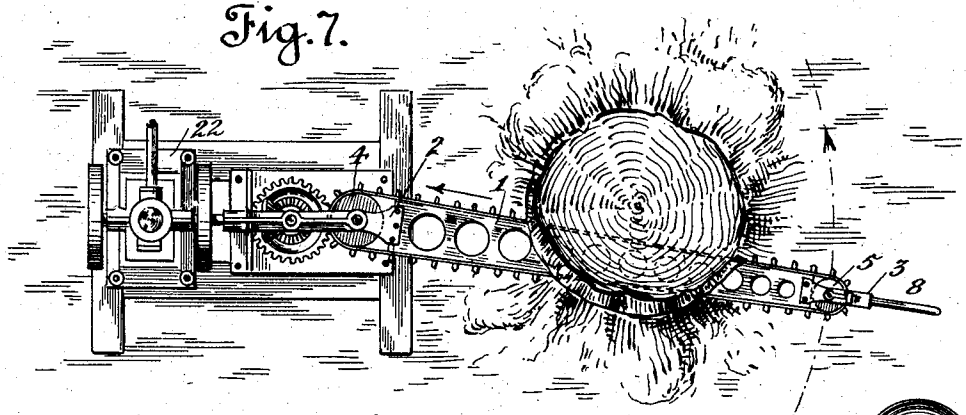
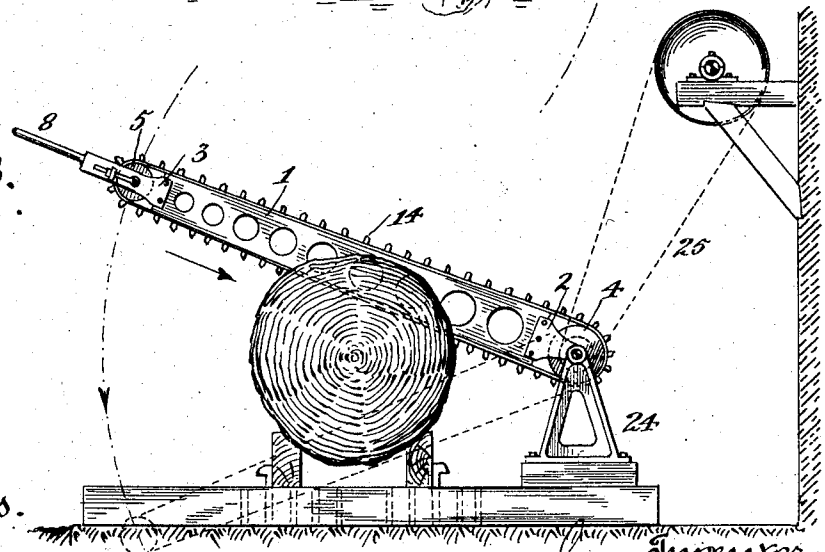


Fig. 8.



Witnesses.

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No. 780,476. Patented January 17, 1905.

UNITED STATES PATENT OFFICE.

SAMUEL J. BENS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF TWO-THIRDS TO JOHN S. KIMBALL, OF OAKLAND, CALIFORNIA.

ENDLESS-CHAIN SAW.

SPECIFICATION forming part of Letters Patent No. 780,476, dated January 17, 1905.

Application filed July 17, 1903. Serial No. 166,030.

To all whom it may concern:

Be it known that I, SAMUEL J. BENS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Endless-Chain Saws, of which the following is a specification.

My invention relates to saws, and my object is to produce a saw adapted for general use, and particularly to crosscut-sawing, for which at the present time hand-operated saws are almost universally employed.

Generally speaking, my saw comprises an endless chain provided with teeth and suitably mounted and guided, which is driven continuously in a single plane of motion. This chain of teeth is adapted to be pivoted at one end in a suitable support, so that it can be swung bodily in an arc against and through a tree, log, slab, or other structure. By its use the slow methods of handsawing can in many cases be superseded by a rapidly-driven mechanically-operated device, producing a great saving in time, expense, and labor, and in many cases enabling material to be saved and utilized which otherwise would be wasted.

An embodiment of my invention is shown in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a top plan of frame and guide-wheels with saw removed. Fig. 3 is an enlarged sectional elevation at one end of the frame. Fig. 4 is a plan view of adjacent links of the chain. Fig. 5 is a detail end view of a link of the chain with a tooth in place, the saw-frame being shown in cross-section. Fig. 6 is an elevation showing a portable saw on horizontal work. Fig. 7 is a plan view of the same. Fig. 8 is an elevation of a mill-saw on vertical work.

Throughout the drawings 1 represents a thin steel frame, preferably tapering from one end to the other and having grooved edges. To the ends are bolted projecting brackets 2 3, which may be formed either in one piece or of separate parallel plates, both constructions being illustrated in the drawings. In bracket 2 is journaled a guide-wheel 4, having a deeply-grooved periphery, and in bracket 3 is adjustably mounted a substantially similar wheel 5, the bracket 3 being slotted and the bearings of the wheel 5 being movable in such slots by screw-bolts 6, which pass through threaded lugs 7 on the bracket. This construction forms a tension device for regulating the tension of the endless-chain saw carried by said wheels. The bracket 3 has a handle 8, by which an operator controls the saw. Mounted on the guide-wheels is an endless chain composed of links 9, which alternate with and are connected by other links 11, all the links being riveted together, so as to form an endless flexible structure. The main links 9 are provided with tapering slots 12 and with projections 13 from their inner edges. These links are substantially of the same width as the thickness of the frame, as shown in Fig. 5, and run upon the straight edges of the latter, while the projections 13 enter and are guided in the grooves in the frame edges, thus keeping the chain straight while traveling between the carrying-wheels. Similarly, the chain-links travel upon the peripheries of the wheels, their projections entering and being guided by the peripheral grooves. In the tapering slot of each link 9 is set a saw-tooth 14, having a tapered shank 15, which tightly fits the slot and shoulders 16, which bear upon the edge of the link adjacent to the slot. An opening 17 is made at the base of each projection 13, partly in order to insure the accurate seating of the shoulders on each tooth and partly to facilitate the extraction of any tooth by permitting the insertion of a suitable tool below its shank. I have shown teeth of different shapes, some having inclined beveled cutting edges 18, which form the kerf, alternating with others having straight transverse cutting edges 19 to form the central drag; but I do not limit myself to any particular shape or style of cutting edge, as under different circumstances or for different kinds of work changes can be made in these particulars, as those skilled in the art will readily understand. This frame, chain, and teeth constitute an endless saw, adapted to run continuously and to form a single saw-cut in the plane of its motion, and it is adapted to kinds and styles of sawing for which neither circu-

lar saws, band-saws, nor mechanically-operated reciprocating saws can be used, and for which hand-operated saws are always employed, the two-handled crosscut-saw being a familiar example.

I have illustrated in the drawings different ways of mounting my saw to show its adaptability to either horizontal or vertical crosscut work. In Figs. 6 and 7 the stump of the tree shown may represent a redwood stump as ordinarily left after felling and contains enough material to make a good bolt, but would ordinarily be left standing, as not warranting the expenditure of time and labor required to saw it through by hand. My saw is in this case shown as mounted upon a portable skid 21 and furnished with driving power, such as a steam-engine, gas-engine, or motor of any kind. The engine 22 is here shown as geared to the shaft of the guide-wheel 4, which is extended into suitable bearings 23 on the skid. The continuously-moving saw is swung on its pivots and otherwise controlled by an operator at the handle 8 and cross-cuts the stump or tree quickly and easily and low down, thus utilizing material ordinarily wasted.

In Fig. 8 the saw is supposed to be set up in a mill and to be employed in cross-cutting logs for bolts. Here the frame is shown as hung in a suitable floor-bracket 24 above the blocks which support the log, and is driven by a belt 25 from the mill-shafting. The saw is thus perfectly free above the log and can be brought down upon and through it under control of the operator with great facility and despatch, the log resting upon floor-blocks.

I am of course aware that continuously-running flexible saws are old and well known, as illustrated by the band-saws in common use; but band-saws although effective for sawing lumber are incapable of crosscut-sawing like that illustrated, because the band necessarily runs in two planes. My saw is flexible in its single plane of motion and the whole frame, with the idle side of the saw, follows the saw-cut through the log, the frame being of a stiffness and rigidity which keeps the saw in perfect line.

I do not limit myself to the constructions and arrangements herein described, and shown in the drawings, as I desire to avail myself of such modifications and equivalents as fall properly within the spirit of my invention.

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

1. A chain-saw structure, comprising a chain-saw, a bar-frame therefor lying wholly within the cutting plane of the saw, having saw-supporting wheels at its ends and pivoted at one end on the axle of one of said wheels, and a handle at the outer or free end extending beyond the cutting range of the saw.

2. A chain-saw structure comprising a chain-saw, a bar-frame therefor lying wholly within the cutting plane of the saw, having saw-supporting wheels at its ends and pivoted at one end on the vertical axle of one of said wheels, and a handle at the outer or free end extending beyond the cutting range of the saw.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 6th day of July, 1903.

SAMUEL J. BENS.

Witnesses:
L. W. SEELY,
GEO. T. KNOX.