No. 640,504. Patented Jan. 2, 1900.

E. E. THOMAS.

STEAM LOG TURNER.

(Application filed Aug. 7, 1899.)

(No Model.) 4 Sheets—Sheet 1.

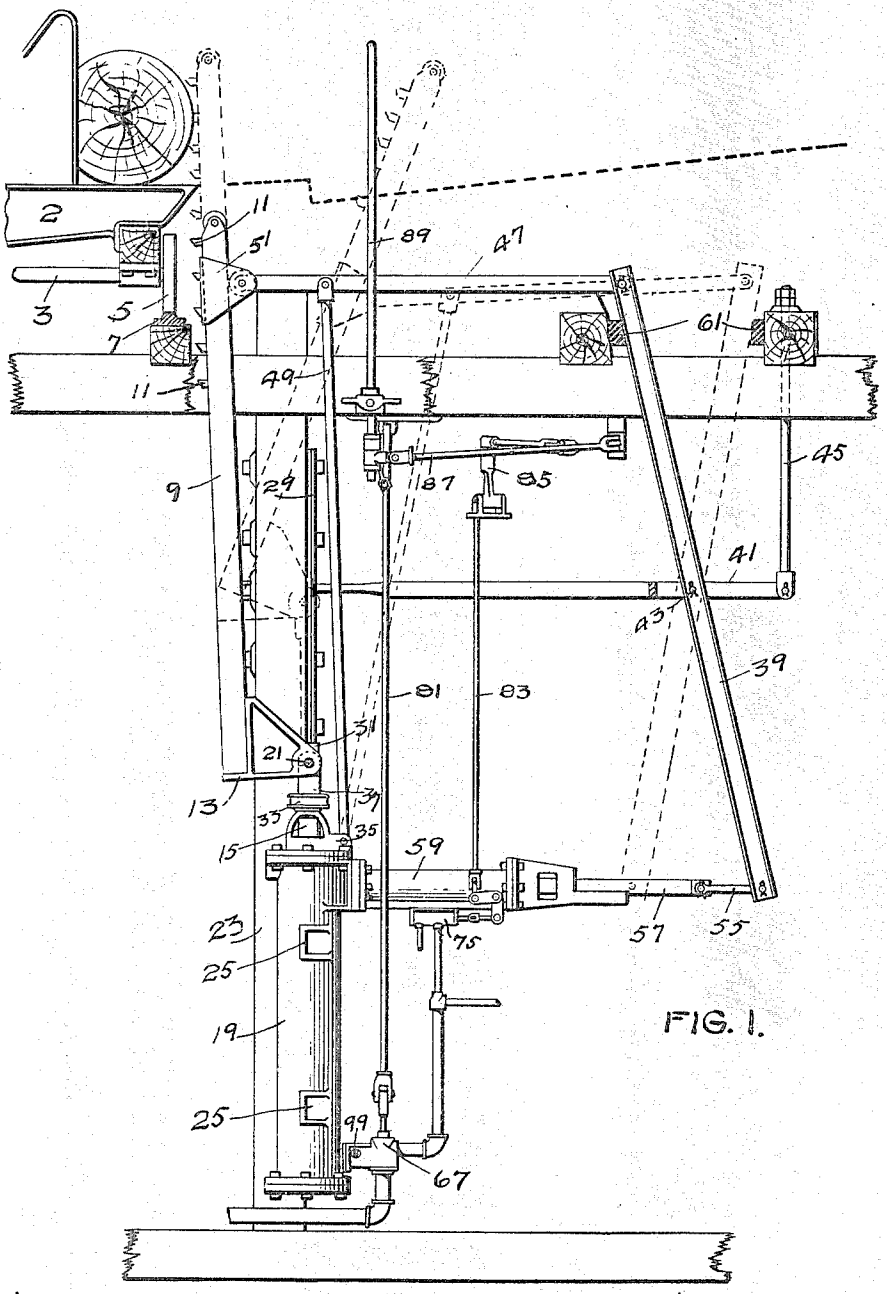


FIG. 1.

WITNESSES
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A. F. Holmes.

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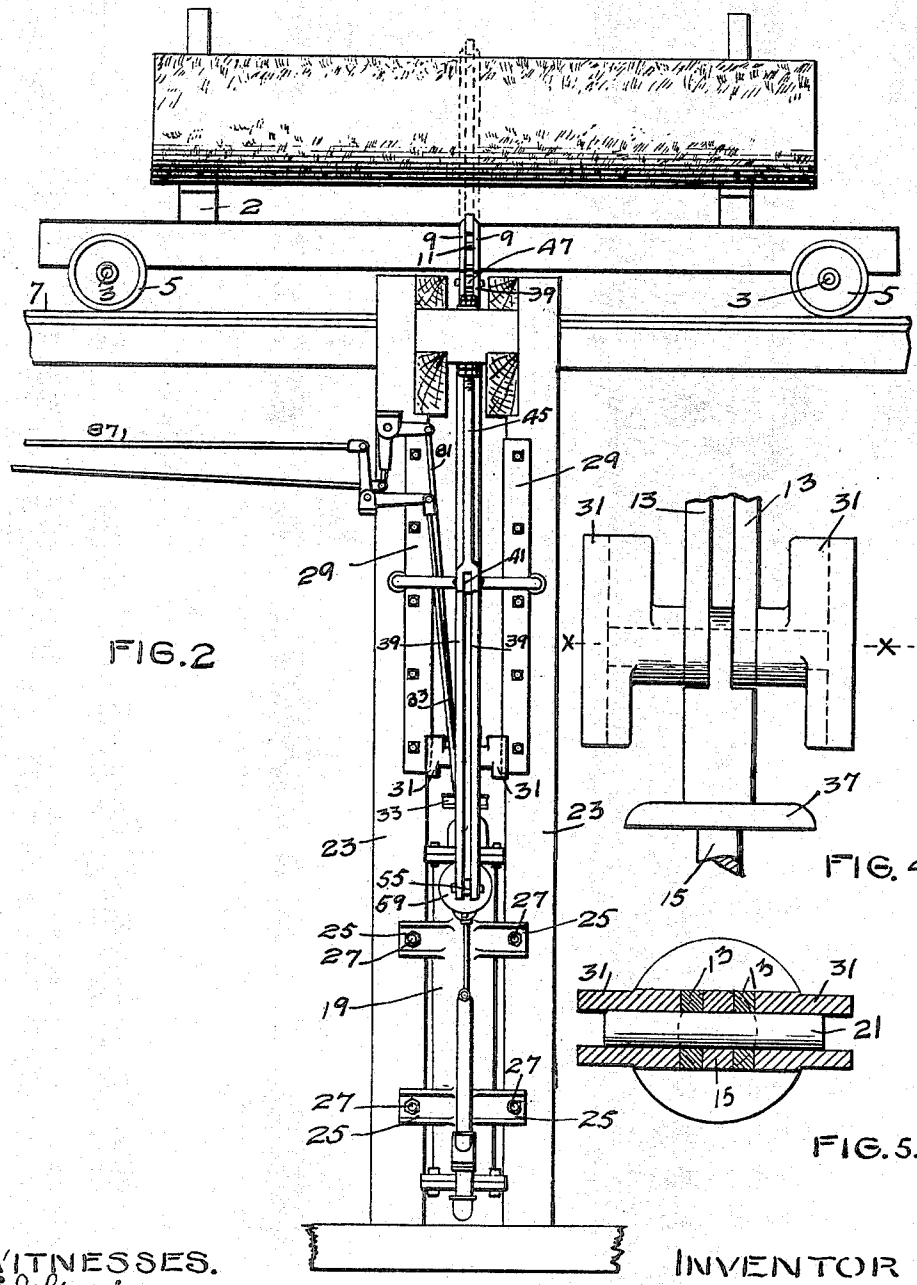


FIG. 2.

FIG. 4.

FIG. 5.

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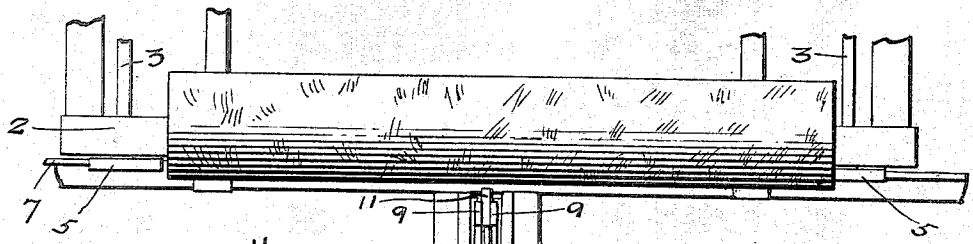
E. E. THOMAS.

STEAM LOG TURNER.

(Application filed Aug. 7, 1899.)

(No Model.) 4 Sheets—Sheet 3.

FIG. 3.



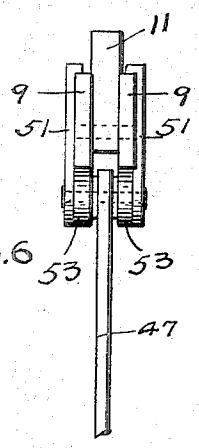


FIG. 6

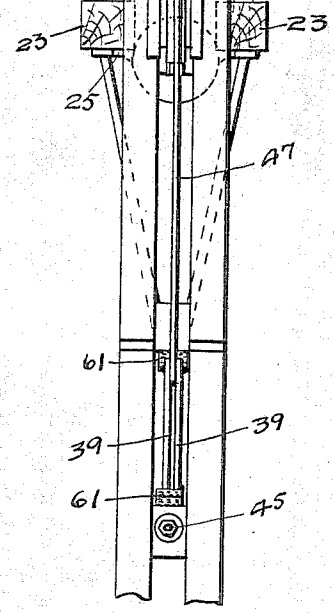


FIG. 8

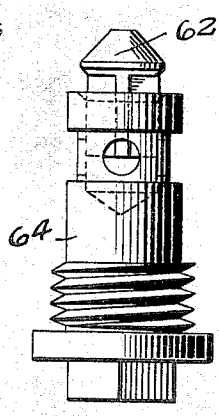
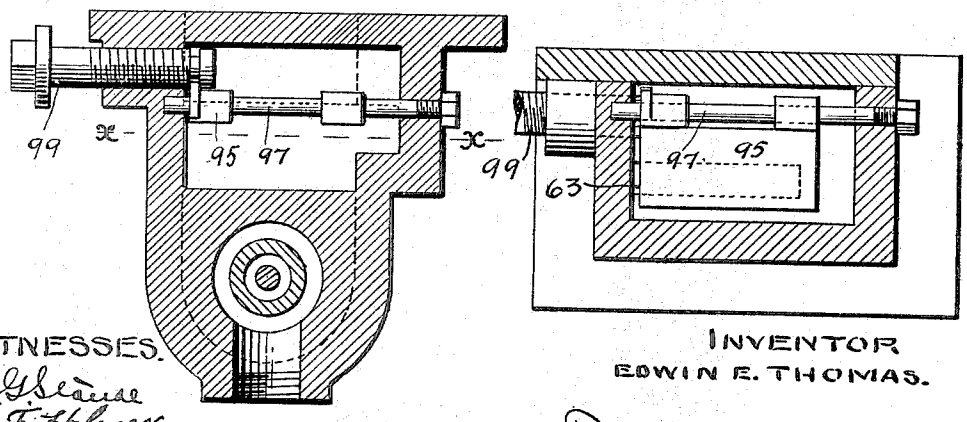


FIG. 7

FIG. 9



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E. E. THOMAS.

STEAM LOG TURNER.

(Application filed Aug. 7, 1899.)

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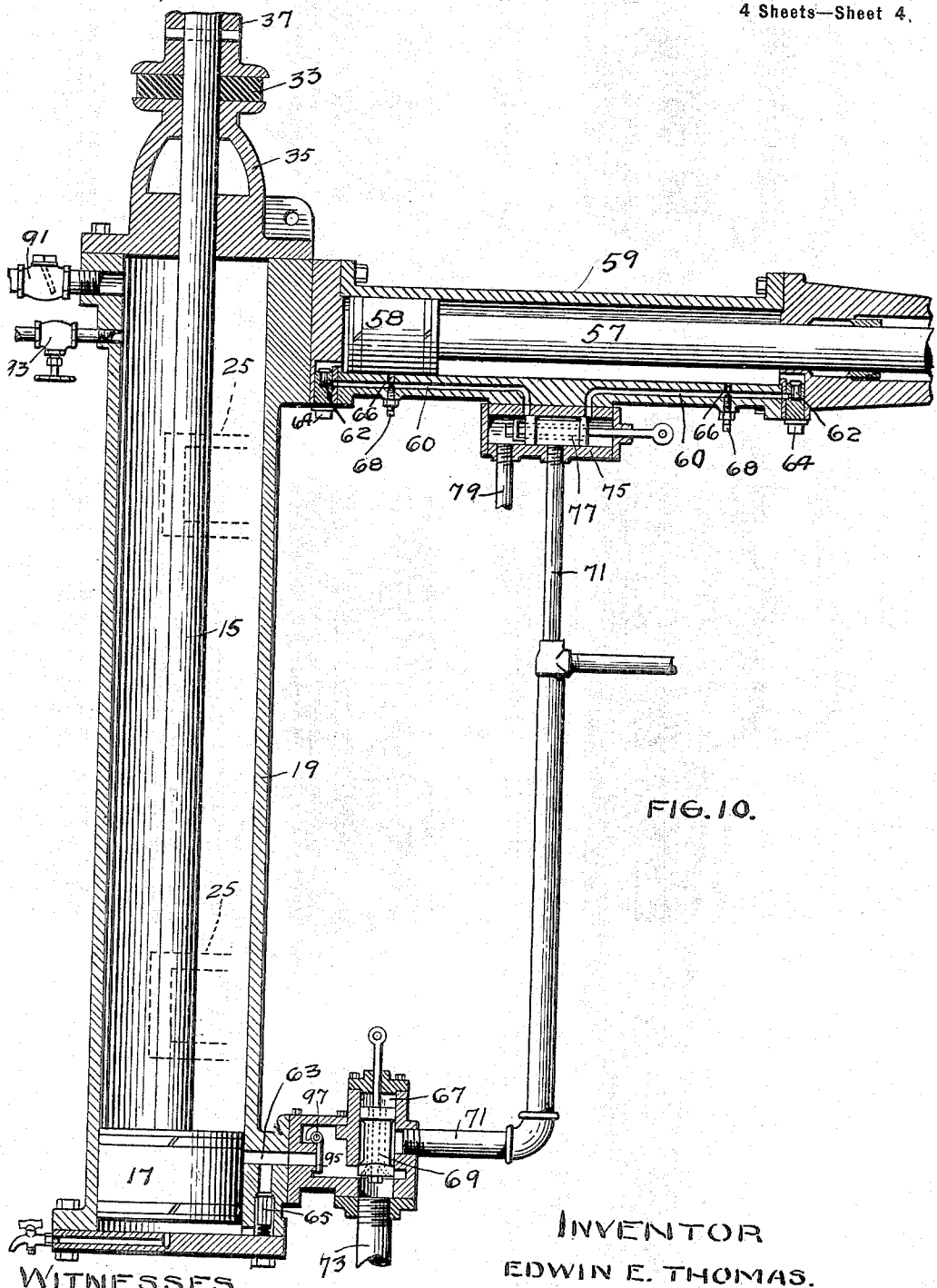


FIG. 10.

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UNITED STATES PATENT OFFICE.

EDWIN E. THOMAS, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE UNION IRON WORKS, OF SAME PLACE.

STEAM LOG-TURNER.

SPECIFICATION forming part of Letters Patent No. 640,504, dated January 2, 1900.

Application filed August 7, 1899. Serial No. 726,357. (No model.)

To all whom it may concern:

Be it known that I, EDWIN E. THOMAS, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Steam Log-Turners, of which the following is a specification.

This invention relates to improvements in steam-operated devices that are adapted to turn logs axially on a sawmill-carriage and to move the same into place on the carriage; and the objects I have in view are to provide an efficient log-turner in which both of the steam-cylinders are arranged upon a single support at a point where they are readily accessible, in which the parts may be so adjusted as to prevent an inexperienced operator from breaking or damaging the machinery, and in which the parts are all so combined and arranged as to form a log-turner of superior durability and rapidity of operation.

To these ends the invention consists generally in the constructions and combinations hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a log-turner embodying my invention. Fig. 2 is an end elevation. Fig. 3 is a plan view. Fig. 4 is a detail of the cross-head and parts connected therewith. Fig. 5 is a detail section on line *x x* of Fig. 4. Fig. 6 is a detail showing in plan view the tooth-bar and the clasp forming a slide therefor. Fig. 7 is a detail of one of the valves of the horizontal cylinder. Fig. 8 is a horizontal section of the valve-casing and throttling-valve of the main cylinder. Fig. 9 is a transverse section on line *x x* of Fig. 8. Fig. 10 is a vertical section of the two cylinders.

In the drawings, 2 represents a portion of an ordinary log-carriage mounted upon suitable axles 3, that are provided with suitable truck-wheels 5, adapted to travel on rails 7. The carriage may be of any ordinary or preferred construction and is provided with the usual head-blocks, set-works, &c. A straight tooth-bar 9, provided with pivoted teeth 11, is arranged to engage a log upon the carriage, as indicated by dotted lines in Figs. 1 and 2. The lower end of the tooth-bar 9 is secured to a suitable casting 13, which forms a means for pivoting the lower end of the tooth-bar to the upper end of the piston-rod 15, which is connected to the piston 17, arranged in the steam-cylinder 19. (See Figs. 4, 5, and 10.) The casting 13 is connected to the piston-rod 15 by means of a pin 21, (see Fig. 5,) which forms the pivot between said casting and said piston-rod. Arranged at each side of the steam-cylinder 19 is a vertical timber 23, and the cylinder is preferably bolted to these timbers. The cylinder is preferably provided with the projections 25, which overlap the face of the timbers, as shown in Fig. 2, and are secured in position by means of the bolts 27. Secured to the timbers 23 above the cylinder 19 are the plates 29, forming slideways or guides for the slide or cross-head 31 31. This cross-head is formed in two parts, as shown in Figs. 4 and 5, each of said parts being provided with a groove in its edge adapted to engage the guide 29, and said two parts of the cross-head are arranged upon opposite sides of the casting 13 and are held in place by means of a pin 21, which, as before stated, forms the pivot between said casting 13 and the piston-rod 15. A suitable rubber cushion 33 is preferably arranged on the cylinder-head 35 and below a collar 37, that is pinned onto the piston-rod 15. (See Fig. 10.) This cushions the piston on its return stroke, as hereinafter described.

The guides 29 and the cross-head 31 together control the vertical movement of the lower end of the tooth-bar 9, while at the same time permitting said tooth-bar to be turned in a vertical plane upon the pin 21, connecting said casting with the piston of the main or upright cylinder. By this means the cross-head 31 is caused to travel in vertical lines, as indicated in Fig. 1. Arranged in the rear of the timbers 23 and preferably in the same vertical plane as the tooth-bar 9 is a sway-bar 39, which is pivoted at or near its central point upon a brace-bar 41. This brace-bar, at the end nearest the carriage, is in two parts and the ends extend through the upright timbers 23 and are secured in position by suitable nuts and washers. The other end of the brace-bar passes between the two parts of the sway-bar 39, and the sway-bar is pivoted to the brace-bar by means of a suit-

able pin 43. The rear end of the brace-bar 41 is connected to a rod 45, that extends at right angles thereto and is connected in a rigid manner to the frame of the mill. (See Fig. 1.) The upper end of the sway-bar 39 has connected to it the horizontal bar 47, pivoted at a point near its forward end to a rod 49, having its lower end pivoted to the head 35 of the cylinder 19. The forward end of the bar 47 carries the guide 51, which engages the forward edge of the tooth-bar 9 at each side of the pivoted teeth 11, and the end of said bar 47 has journaled within the guide 51 the rolls 53, which bear against the rear edges of the two parts of the tooth-bar 9. (See Fig. 6.) It will be understood that the tooth-bar 9 is formed in two parts, as shown in Figs. 2 and 3, and that the pivoted teeth 11 are arranged between the two parts of the tooth-bar. The guide 51 extends on both sides of the bar and is provided with the inturned flanges which grasp the forward edge of each part of the tooth-bar, (see Fig. 6,) and the rolls 53, which are preferably mounted upon the same pin or journal which secures the guide 51 to the bar 47, bear upon the rear edges of the two parts of the tooth-bar, so that the position of this guide 51 completely controls the direction of upward movement of the tooth-bar 9. The lower end of the sway-bar 39 is connected by a link 55 with the piston-rod 57 of the horizontal cylinder 59. The cylinder 59 is preferably arranged horizontally and at right angles to the cylinder 19, being preferably bolted thereto. This arrangement secures both cylinders in line, one with the other, provides a common base for both, and brings both cylinders into position where they may be readily accessible to the person taking care of the machine.

I will hereinafter describe more particularly the arrangement of the cylinders in reference to each other and the steam-valves for controlling the admission and exhaust of steam therefrom.

I prefer to provide a rubber cushion 61 at each side of the upper end of the sway-bar 39. This forms a cushioned stop for the bar at the limit of its movement in either direction.

As before stated, the cylinder 59 is arranged at right angles to the cylinder 19, being preferably bolted thereto, as shown in Figs. 1 and 10. The cylinder 19 thus forms a support for the cylinder 59. Both cylinders are arranged in the same vertical plane, and both cylinders are arranged in the lower part of the mill, where they are of easy access by the person attending them.

It has been proposed in some instances heretofore to use in steam log-turners an upright cylinder and a horizontal cylinder, but in such instances the horizontal cylinder has been independent of the upright cylinder and has generally been located at a point directly beneath the sawing floor and with its piston-rod connected directly to the tooth-bar of the log-turner. By this means while it was possible to give the two movements to the tooth-bar the horizontal cylinder was difficult of access, had to be located on an independent foundation or base, and considerable care was required to locate the cylinders in proper relation to each other. All of these difficulties are overcome by mounting the horizontal cylinder directly upon and at right angles to the upright cylinder, as shown in Figs. 1 and 10 of the drawings.

I provide in connection with the upright cylinder 19 an inlet-port 63, having a check-valve 65 located at or near the bottom of the cylinder, and I also provide the valve-chamber 67, having therein the usual slide-valve 69 and having the usual steam-pipe 71 and exhaust-pipe 73 connected thereto, and I also provide in connection with the cylinder 59 the valve-chamber 75, having therein the usual valve 77 and having connected thereto the steam-pipe 71 and the exhaust-pipe 79. These valves 69 and 77 are connected through the usual rods 81 and 83 and levers 85 87 with the operating-lever 89. These parts are of any usual or preferred construction. By moving the lever 89 in one direction the valve 69 may be opened to admit steam into the cylinder 19 below the piston 17. By moving the lever 89 in a direction at right angles to that required for operating the valve 69 the valve 77 may be operated, and by moving the lever 89 on a diagonal line between the aforesaid lines of movement both valves may be simultaneously operated. This arrangement of valves in connection with the universally-mounted lever is of usual construction, however, and forms no part of my present invention. I find it advisable, however, to provide in connection with the cylinder 19 adjustable means for throttling the steam that is admitted thereto, so as to prevent an inexperienced operator from moving the piston too rapidly. As here shown, the cylinder is provided at or near its upper end with a check-valve 91 and a throttling-valve 93. I also provide in the steam-inlet passage at the base of the cylinder the adjustable throttling-valve 95. (See Figs. 8, 9, and 10.) This valve is mounted on a horizontal pin 97 and is held by pressure of the incoming steam against the port 63. The valve is adjustable longitudinally upon the supporting-stem 97 by means of the screw 99, and it is normally permitted to stand open only a small amount, as shown in Fig. 9, thereby causing all of the steam that enters the cylinder to pass through the narrow space at the end of the valve and into the port 63. The position of the valve 95 may be adjusted as desired, and it makes no difference whether the valve 69 be opened wide or not, as the steam can enter the cylder only as fast as the position of the valve 95 will permit. When, however, the steam is to be exhausted from the cylinder 19, any pressure upon the opposite side of the valve 95 will cause it to swing open, thereby uncovering the entire port 63 and permitting the

exhaust-steam to pass rapidly out of the cylinder. As the steam enters the cylinder 19 below the piston 17 said piston is raised in the cylinder, and the air in the cylinder must pass out through the throttling-valve 93, as none of it can escape through the check-valve 91. The air in the cylinder therefore forms a cushion for the moving piston, and by adjusting the throttling-valve 93 the speed of the piston may be regulated. It thus becomes possible for the mill owner or proprietor or the person having charge of the machinery to regulate the speed at which the tooth-bar of the log-turner may be raised. This is done by proper adjustment of the valves 93 and 95. As here shown, the cylinder 19 is adapted to take steam at one end only, and the steam-pressure is used only for the purpose of raising the piston in the cylinder. When the steam is exhausted therefrom, air enters the upper end of the cylinder freely through the check-valve 91, and the weight of the tooth-bar, piston-rod, and connected parts causes the piston to travel downward within the cylinder.

In the cylinder 59 I provide a piston 58, to which the piston-rod 57 is connected. The cylinder 59 takes steam at both ends through the ports 60, which connect with the steam-chest 75, and each of said ports is provided with a check-valve 62. This check-valve is preferably mounted in the inner end of a plug 64, (see Fig. 7,) that is adapted to be screwed into an opening in the cylinder-head. Steam entering the cylinder passes through one or the other of the valves 62, but said valve closes against the pressure of the exhaust-steam, and the exhaust-steam is therefore compelled to pass from the cylinder into one of the ports 60 through one of the openings 66, and a throttling-valve 68, consisting of a threaded stem arranged in the wall of the cylinder, is adapted to close to a greater or less extent either of the openings 66. By this means when steam is admitted to one end of the cylinder 59 to drive the piston 58 toward the opposite end of the cylinder the steam on the other side of the piston must escape through the throttled opening 66, and the position of the throttling valve or plug 68 regulates or controls the escape of steam from the cylinder and therefore the travel of the piston therein.

The log-turner herein described is, it will be seen, of simple construction. The tooth-bar may be held at all times in engagement with the log no matter what its diameter may be. The cylinders are both mounted upon a single support and are both in position where they are readily accessible either for the purpose of adjusting the throttling-valves or for any other purpose. Both cylinders being arranged upon a common support are easily put in position and no special adjustment thereof is necessary. The tooth-bar is at all times under perfect control, and the simplicity of the log-turner enables it to be of the most durable construction.

I claim as my invention—

1. The combination, in a log-turner, with an upright operating-cylinder, piston and piston-rod, of a pivoted and vertically-movable tooth-bar carried by said piston-rod; a horizontal cylinder mounted upon said upright cylinder; a piston and piston-rod in said horizontal cylinder; a guide controlling the movement of the upper part of said tooth-bar, and an upright sway-bar, having its lower end extended to the plane of and connected to the piston-rod of the horizontal cylinder and its upper end connected to said guide, substantially as described.

2. The combination, in a log-turner, with an upright steam-cylinder and a small horizontal steam-cylinder, supported on said upright cylinder, each of said cylinders being provided with a piston and piston-rod, of a tooth-bar pivoted upon the piston-rod of the upright cylinder and a pivoted sway-bar having its upper end connected with said tooth-bar and controlling its movement and its lower end extended to the plane of and connected with the piston-rod of the horizontal cylinder, for the purpose set forth.

In witness whereof I have hereunto set my hand this 3d day of August, 1899.

EDWIN E. THOMAS.

In presence of—
A. C. PAUL,
A. F. HOLMES.