(No Model.) 2 Sheets—Sheet 1.

R. W. SHELBOURNE.

LOG TURNER.

No. 341,951. Patented May 18, 1886.

Fig. 2.

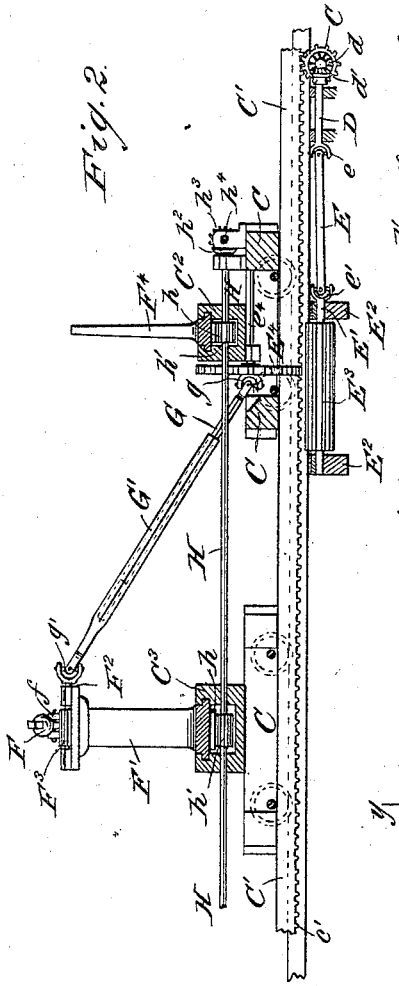
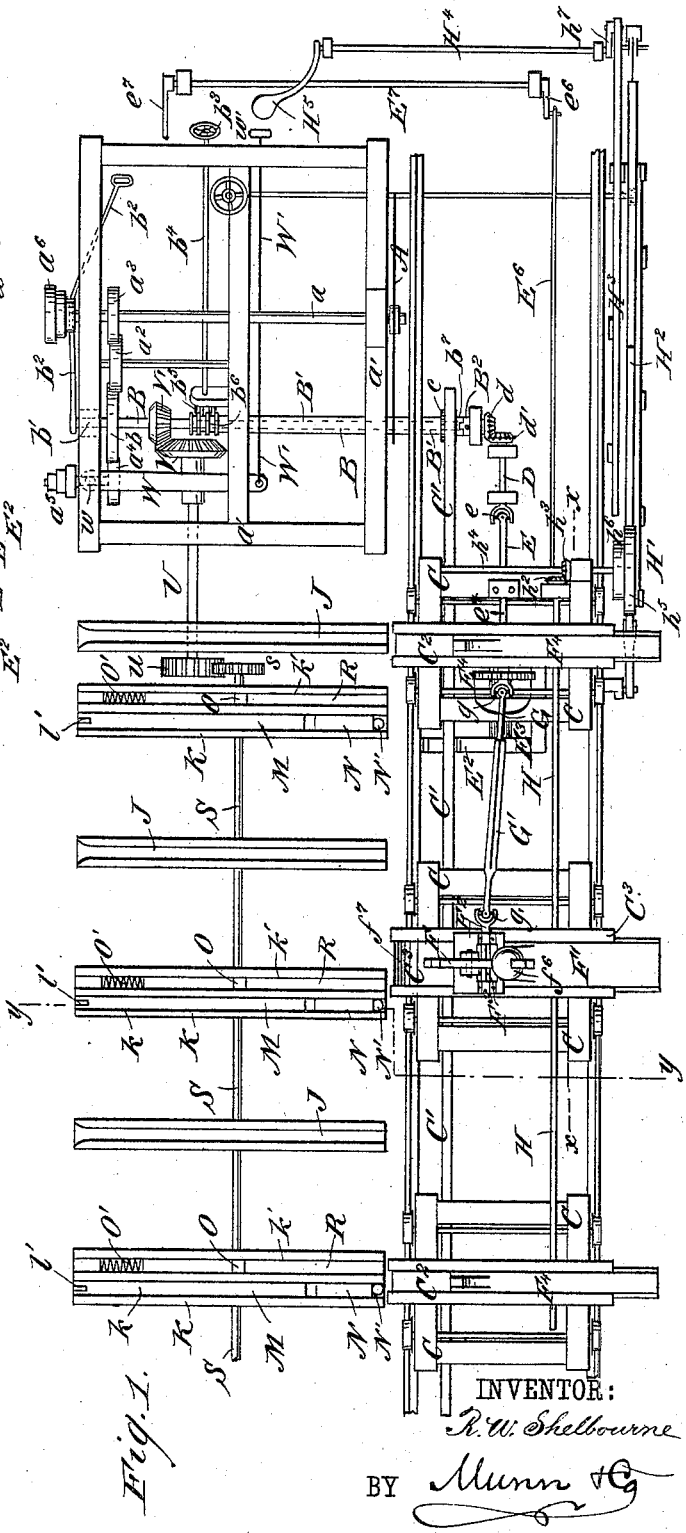


Fig. 1.



WITNESSES:

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C. Sedgwick

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BY Munn & Co

ATTORNEYS.

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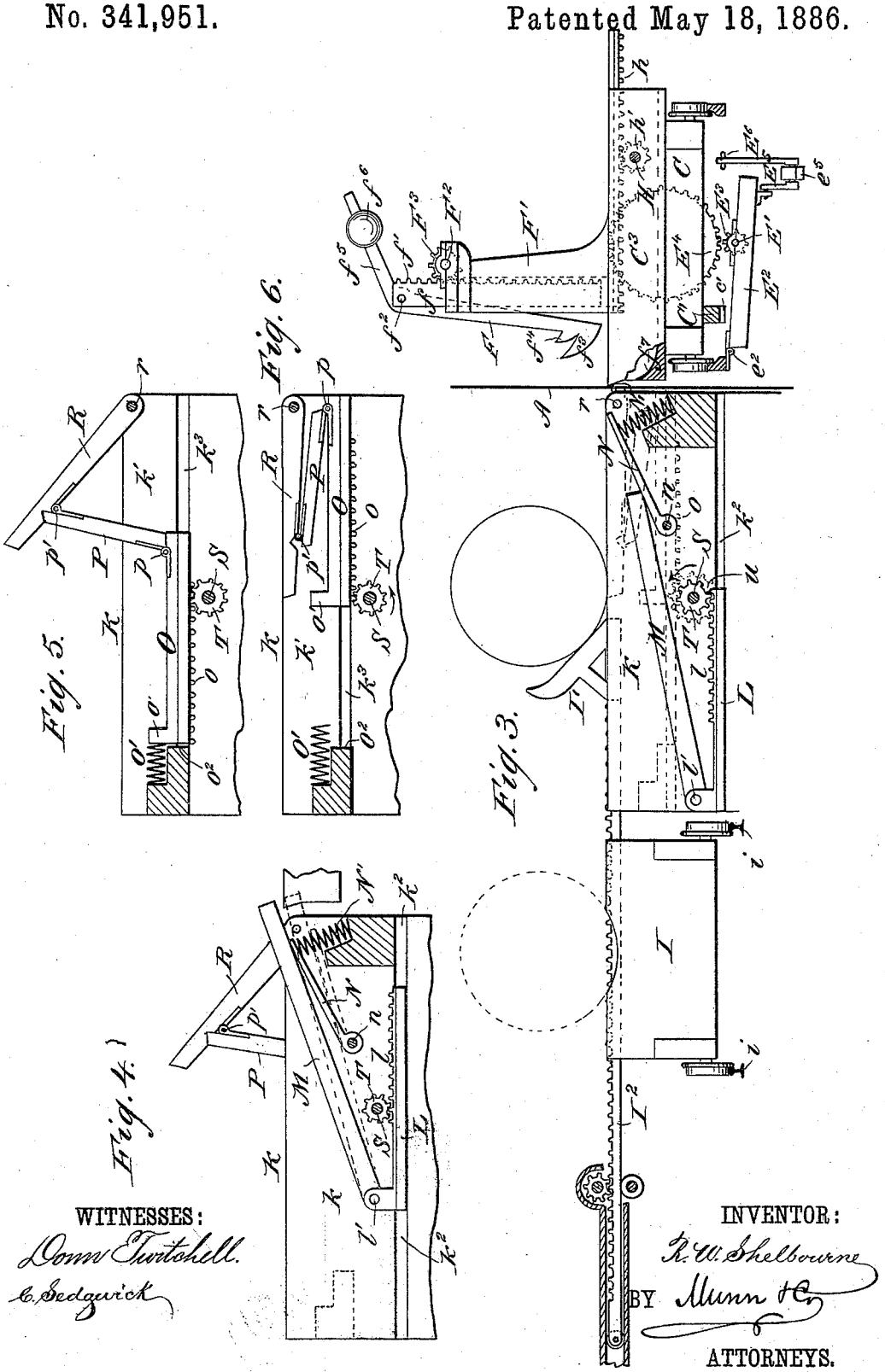

WITNESSES:
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INVENTOR:
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UNITED STATES PATENT OFFICE.

ROBISON W. SHELBOURNE, OF BLANDVILLE, KENTUCKY.

LOG-TURNER.

SPECIFICATION forming part of Letters Patent No. 341,951, dated May 18, 1886.

Application filed July 6, 1885. Serial No. 170,774. (No model.)

To all whom it may concern:

Be it known that I, ROBISON W. SHELBOURNE, of Blandville, in the county of Ballard and State of Kentucky, have invented a new and Improved Log-Turner for Saw-Mills, of which the following is a full, clear, and exact description.

My invention relates to log-turning apparatus for saw-mills, and has for its object to facilitate the turning of the logs on the mill-carriage, and by devices acting automatically and all in ready command of the sawyer, so that the work may be done by the machinery of the mill and without using cant-hooks operated by hand, thereby economizing time and labor.

The invention consists in certain novel constructions and combinations of parts of the log-turning apparatus, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a saw-mill fitted with my log-turning apparatus. Fig. 2 is a longitudinal sectional elevation taken through the saw-mill carriage on the line *x x*, Fig. 1, and in larger size. Fig. 3 is a transverse sectional elevation taken on the line *y y*, Fig. 1, and showing also parts of devices I employ for pushing the log to the mill-carriage; and Figs. 4, 5, and 6 are enlarged detail views of portions of the log-turning devices.

The letter A indicates the circular saw of the mill, which is journaled by its shaft *a* in the saw-frame *a'*, and the letter B indicates the shaft from which the carriage, the log-turning head-block, hook, and pushing-arms, and inclined benches are operated, as hereinafter described.

a^2 is a friction-wheel, which is journaled so as to be in contact with the friction-wheel a^3 on the saw-shaft, and a^4 is a friction-wheel, which has cone-pulleys a^5, receiving a belt from cone-pulleys a^6 on the saw-shaft *a*, said wheels a^2 a^4 running continuously at opposite sides or faces of the friction-wheel *b*, fixed on the driving-shaft B, which is fitted in adjustable bearings at *b'* on the saw-frame, and is connected to a lever, b^2, in reach of the sawyer, who may work the lever for throwing the wheel *b* against the friction-wheels a^4 a^2, respectively, for feeding the log to the saw and running back the carriage C by means of a pinion or gear-wheel, *c*, which is fast to a long sleeve, B', splined to the shaft B, so that gear-wheel *c* may be turned with shaft B at the proper time to engage a rack, *c'*, on the under side of a rail, C', fixed to the carriage, and as hereinafter more fully explained.

On the end of shaft B, beneath the carriage-way, is fixed a half-clutch, B^2, which carries fixedly the bevel gear-wheel *d*, which meshes with the bevel gear-wheel *d'*, fast on a shaft, D, which is journaled to suitable posts set in the ground or to supports fixed to the carriage-bed. This shaft D connects by a universal joint, *e*, a shaft, E, and a universal joint, *e'*, with a shaft, E', which is journaled in a frame, E^2, pivoted at e^2 to one of the carriage-tracks or other fixed support. The shaft E' carries the long fast pinion E^3, which is adapted to engage a gear-wheel, E^4, fixed to a shaft, e^4, which is journaled to the carriage head-block C^2 next the one C^3, in which latter is fitted the knee F', in which the log-turning or cant hook F is arranged, as presently described.

To the farther end of the shaft e^4 of gear-wheel E^4 is connected by a universal joint, *g*, the shaft G, which is fitted telescopically in a tubular shaft, G', which in turn is connected by a universal joint, *g'*, with the shaft F^2, journaled at the head of the knee F', and on which shaft F^2 is fixed a pinion or gear-wheel, F^3, which meshes with a rack, *f'*, formed along the back edge of the post *f*, to which the cant-hook F is pivoted at f^2, the post *f* being fitted to slide vertically in the knee F', for raising the hook F and allowing it to fall. I make the cant-hook F with a long hook-point, f^3, to catch round logs or round faces of partly-squared logs, and with a shorter hook, f^4, to catch squared corners of logs in turning them. The hook has a backwardly-bent upper arm, f^5, on which is placed a weight, f^6, for swinging the hook-points outward beyond the face of the knee to catch on the log, and the head-block has a curved inward finish at the outer lower portion, as at f^7, on which the curved back of the point f^3 may strike as the hook swings downward at the front of the head-block, and which at such times insures a back swing of the hook-points out of the path of the

saw. The shafts D E and long pinion E^3 will turn when the shaft B is turned by either friction-wheel a^2 or a^4, and the frame E^2 will be raised to gear the pinion E^3 with the wheel E^4, for lifting the cant-hook F by the gearing operated by the shaft G G′ only after the carriage has been run back after making the last cut prior to turning the log, said pinion E^3 being made long, so that the wheel E^4 on the carriage will gear with it should the carriage not stop precisely at the same place every time a log is to be turned.

For swinging the frame E^2 upward on its hinge to engage the gears E^3 E^4, I employ a two-armed crank, E^5, which is journaled in a fixed support, e^5, Fig. 3, and is connected by one arm to the frame and by its other arm to a rod, E^6, which connects to a crank-arm, e^6, on one end of a rod, E^7, which is journaled to suitable supports, and has a foot-lever, e^7, in command of the sawyer, who may operate said lever to hold the gears E^3 E^4 in mesh as long as may be required to lift the hook F sufficiently for turning logs of different sizes, and as the hook-points f^4 f^5 are liable to stick in the log as it turns the lever b^2 will be operated just as the log is falling over on the benches, hereinafter described, to throw the friction-wheel b away from the friction-wheel a^4, by which contact the turning-hook had been raised, and the sawyer will throw the wheel b against the opposite friction-wheel, a^2, which has a quicker motion than the friction-wheel a^4, and reverses the motion of the turning-hook F, or moves it downward quickly to disengage the hook-point from the log just as the log falls over on the benches, and drive the hook down and back into the recess in the head-block made for it, and after the turning-hook has been disengaged from the log, as above described, pressure on the lever e^7 will be relaxed to allow the weight of the frame E^2 to lower it and disengage the gears E^3 E^4.

When the carriage is to be run either way, a hand-wheel, b^3, on a shaft, b^4, journaled in the saw-frame will be turned in one direction to cause a pinion, b^5, on said shaft engaging an annular rack, b^6, on the sleeve B′, to move the sleeve lengthwise on the shaft B, for engaging a half-clutch, b^7, on the end of the sleeve with the half-clutch head B^2, which is keyed or pinned to the shaft B and turns with it. The hand-wheel and shaft b^3 b^4 will be turned the other way for disengaging the clutch b^7 B^2 to allow the carriage to remain at rest when the log-turning hook, log-pushers, and inclined benches are to be operated, as hereinafter described.

The head-block knee F′, which carries the cant-hook F, and the knees F^4 of all the other head-blocks C^2 of the log-carriage are provided alike with racks h, with which pinions h' on a shaft, H, are adapted to engage, said shaft H being journaled in the carriage and carrying a bevel-pinion, h^2, which engages a bevel-pinion, h^3, on a short shaft, h^4, which is journaled across the carriage C, and carries at its outer or back end the wheel H′, which has two rims, h^5 h^6, adapted to engage the rails H^2 H^3, respectively. A contact of the wheel-rim h^5 with the rail H^2, which is lifted by link-connections and rack-and-pinion mechanism, operates to set the knees and log up toward the saw A in the first part of the forward run of the carriage, and the contact of the wheel-rim h^6 with the rail H^3 operates to back off the head-block knees, as required in turning the log, and as hereinafter more fully explained.

The mechanism for setting up the log and backing off the head-block knees is fully shown and described in Letters Patent No. 308,538, granted to me September 23, 1884, and it will suffice here to state that the backing-off rail H^3 is connected by a crank-arm, h^7, with a shaft, H^4, which is suitably journaled, and has a foot-lever, H^5, near the sawyer, who may press the lever down as the carriage runs back, to cause the backing off of the headblock-knees prior to and while turning the log, by means of the hook F and the push-arms and benches, as presently described.

At I in Fig. 3 is shown the log-truck, which runs on tracks i i, and receives the logs to bring them into the mill, and opposite skids, J, and push-arm guide blocks K, which also serve as skids, onto and over which skids and blocks J K the logs are pushed by the heads I′ of rack-bars I^2, which are operated by rack-and-pinion mechanism at the other side of the log-truck way. These rack-bars I′ I^2 will not be herein particularly described, as they, with their operating mechanism and related parts, form the subject-matter of another application for Letters Patent filed of even date herewith.

Each of the blocks K is provided with two parallel lengthwise grooves, k k', which range at right angles with the mill carriage C. In the groove k of each block is fitted in grooves or ways k^2 a rack-bar, L, which has pivoted to its back or outer end at l' the arm M, which pushes the log over by bearing on its outer face below its longitudinal center as the log is raised at its rear side by the log-turning hook, as hereinafter more fully explained. Under the arm M is pivoted at n a lever, N, which is forced upward to the push-arm M by a spring, N′, set into a recess at the forward end of block K, said spring normally holding the arm M up into position for action on the log in turning it, and allowing the arm, with the lever N, to be pressed down below the top of block K by the log as it falls. The lever N serves also as a support and guide to the arm M when it is fully drawn back, as in Fig. 3.

In the groove k' of each block K is fitted to slide in a groove or way, k^3, a rack-bar, O, which at its forward end has hinged to it, as at p, a brace, P, the other end of which is hinged at p' to a bar, R, which is pivoted at its forward end at r to the block K. (See Figs. 5 and 6.)

To a shaft, S, which is journaled in suitable

bearings in the skids J and blocks K, are fixed a series of pinions, T, which engage the teeth *l o* of the rack-bars L O, respectively, and at diametrically opposite sides of the pinions, so that as the shaft S is turned the rack-bars L O will be moved in reverse directions for operating the push-arms M and the log-benches P R, as presently explained.

As the pinions operating the rack-bars O run out of their racks *o* at the extreme back portions of the bars, and remain so while the push-arms M are fully projected for turning the log, I have provided springs O′, to act against the back ends, *o′*, of the bars O to force these bars forward, so that their racks *o* will be engaged by the pinions T on the reverse motion of the shaft S, for moving back the push-arms M and lowering the benches P R, as hereinafter more fully described.

Motion is given shaft S by means of a gear-wheel, *s*, on it, meshing with a gear-wheel, *u*, on the outer end of a shaft, U, which is journaled in the saw-frame *a′*, and in one of the skids J, and is capable of endwise movement, and on the other end of shaft U is fixed a bevel-gear wheel, V, which is adapted to mesh with the bevel-gear wheel V′, fast on the driving-shaft B, which may be rotated in opposite directions by the friction-wheels *b a² a⁴*, as hereinbefore explained.

The hub of gear-wheel V has a suitable connection with a lever, W, which is pivoted at *w* to the saw-frame, to cause the gear-wheel V to be engaged with the gear-wheel V′ when a rod, W′, fixed to the free end of the lever W, is drawn upon, the handle *w′* of said rod being within easy reach of the sawyer, and when the rod W′ is pushed back the gears V V′ will be disengaged to disconnect shafts S B, to allow the other mechanism of the mill to be operated for moving the carriage.

The operation of the log-turning mechanism is as follows: While the log-carriage is being run back after the last cut through the log, prior to turning it, and during the last part of the back movement of the carriage, the sawyer will press lever H⁵, to throw the rail H³ against the rim *h⁶* of friction-wheel H′ to back off the head-blocks, to carry the overhanging lower corner of the log on which it turns in upon the head-blocks. The sawyer then will operate hand-wheel *b⁵* to move sleeve B′ to disconnect the clutch *b⁷* B², to allow the carriage to rest, and then he will operate the foot-lever *e⁷* to raise the hinged frame E² to throw the pinion E³ into gear with the wheel E⁴, which will give motion to pinion F³, to raise the cant-hook F to turn the log, and meanwhile the sawyer will draw on lever W′, to engage the gears V V′, and also will operate lever *b²*, to engage the wheel *b* of driving-shaft B with the friction-wheel *a⁴*, to rotate shaft S and its pinions T in direction of the arrows in Figs. 3 and 6, and cause the push-arms M to be projected against the lower portion of the log, to push it back as the hook F lifts the log, and whereby the log will be turned so as to fall on the benches R, which had been raised as the push-arms M were thrust forward, and the log will press down the arms M without injuring them. The benches R are supported against the shocks of the log on them in falling by the impact of the back ends of the slides O against shoulders *o²* on the guide-blocks K. The partly turned log will slide by its gravity down the inclined benches R, onto the mill-carriage, being thereby fully turned ready to be dogged to the head-blocks, whereupon the motion of shaft S will be reversed by throwing the wheel *b* against the friction-wheel *a²*, for simultaneously lowering the benches R, and drawing back the push-arms M to the positions shown in Figs. 3 and 6, and the lever W′ will be pushed back to disengage the gears V V′, and the set-works H H′ H² will be operated to set the dogged log to the saw by shifting the head-blocks, the sleeve B′ being moved by operating hand-wheel *b⁵* to engage the carriage-rack by the pinion *c*, as before described, and all is ready for the next cut through the log. The telescoping-shaft G G′ allows the head-blocks to be shifted lengthwise of the carriage to accommodate logs of different lengths, and meanwhile maintain operative connections with the cant-hook F, as above described.

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

1. A log-turning apparatus for saw-mills, comprising a cant-hook hung to a bar vertically movable in one of the head-block knees and provided with a rack, a pinion on the knee gearing with said rack, a shaft coupled to the shaft of said pinion and to a gear-wheel mounted in an adjacent head-block and adapted to be geared with a pinion which is connected by shafts and pinions with the driving-shaft, and push-arms fitted to slide in guide-blocks arranged transversely to the carriage, and mechanism, substantially as described, for operating said push-arms from the driving-shaft, substantially as herein set forth.

2. A log-turning apparatus for saw-mills, comprising a cant-hook hung to a bar vertically movable in one of the head-block knees and provided with a rack, a pinion on the knee gearing with said rack, a shaft coupled to the shaft of said pinion and to a gear-wheel mounted in an adjacent head-block and adapted to be geared with a pinion which is connected by shafts and pinions with the driving-shaft, push-arms fitted to slide in guide-blocks arranged transversely to the carriage, folding benches comprising bars linked to slides fitted in guide-blocks and adapted to be set up in inclined positions to receive the turning log, and mechanism, substantially as described, for operating said push-arms and benches from the driving-shaft, substantially as herein set forth.

3. In log-turning apparatus for saw-mills, the cant-hook F, pivoted to a bar adapted to

slide vertically in a knee of one of the head-blocks, and provided with long and short hook-points f^3 f^4, substantially as herein set forth.

4. In log-turning apparatus for saw-mills, the combination, with the cant-hook F, pivoted to the rack-slide f, fitted in a head-block knee, and provided with hook-points and a rearwardly-extending arm, f^5, of the weight f^6, substantially as herein set forth.

5. In log-turning apparatus for saw-mills, the combination, with the head-block c^3, having an inclined or rounded face, f^7, at its inner end portion, of the head-block knee F' and the weighted cant-hook F, pivoted to a slide, f', fitted in the head-block knee, substantially as described, whereby the hook will be forced inward as it falls to clear the saw, as set forth.

6. In log-turning apparatus for saw-mills, the combination, with the push-arms M, pivoted to slides fitted in guide-blocks K, of the levers N, pivoted to the guide-blocks, and the springs N', and mechanism for operating said slides, substantially as herein set forth.

7. In log-turning apparatus for saw-mills, the combination, with the push-arms M, pivoted to slides L, having racks l, and fitted in guide-blocks K, of the shaft S, having pinions T, meshing with racks l, substantially as herein set forth.

8. In a log-turning apparatus, the combination, with the head-block having a vertically-sliding cant-hook, of a guide-block in front of the cant-hook, a folding bench on said guide-block, and mechanism for operating said hook and bench, substantially as set forth.

9. In a log-turning apparatus, the combination, with a vertically-adjustable cant-hook, of a guide-block in front of the same, a folding bench on said guide-block, a sliding pusher mounted on the guide-block parallel with the bench, and mechanism for operating the cant-hook, bench, and pusher, substantially as and in the manner set forth.

10. In a log-turning apparatus, the guide-block and the folding bench, in combination with the sliding pusher, also on said guide-block, and a shaft and gearing for simultaneously operating said bench and pusher, substantially as set forth.

11. In log-turning apparatus for saw-mills, the combination, with the guide-blocks K, the shaft S, and pinions T, below said blocks, of the slides O, having racks o on their under sides, meshing with the pinions T, the benches R, pivoted at r to the guide-blocks, and the braces P, hinged at their ends to the slide O and benches R, substantially as set forth.

12. In log-turning apparatus, the combination, with the guide-blocks K, the shaft S, below the same, and the pinions T, of the rack-slides O o, operated by said pinions, the springs O' on the guides in rear of the slides, the benches R, pivoted at r to the guides, and the braces P, hinged at p p' to the slides and benches, substantially as set forth.

13. In a log-turning apparatus, the combination, with the guide-blocks K, having ways formed therein, and shoulders O^2 at the rear ends of said ways, of the slide-racks O o in said ways in front of the shoulders, the benches R, hinged at r to the guide-blocks, the braces P, hinged at p p' to the slides and benches, the operating-shaft S and pinions T, meshing with the racks of the slides, substantially as set forth.

14. The combination, with the log-turning mechanism, and the driving-shaft S, and pinions T therefor, of the shaft U, having a pinion, u, meshing with a pinion, s, on the end of shaft S, and a bevel-gear, V, the shaft B, the bevel-gear V' thereon, adapted to mesh with the bevel-gear V, and means for throwing the bevel-gears V V' into and out of engagement, substantially as set forth.

15. The combination, with the log-turning mechanism, the driving-shaft S, and pinions T, for operating the same, of the shaft U, having a pinion, u, on one end meshing with a pinion, s, on said shaft S, and a bevel-gear, V, on its other end, the lever W, connected with the gear V, the operating-rod W', for operating the lever W, and the shaft B, having a gear-wheel, V', adapted to be engaged by the bevel-gear V through the medium of the rod W' and lever W, substantially as set forth.

ROBISON W. SHELBOURNE.

Witnesses:
BEN FLINT,
W. F. HAWES.