3 Sheets—Sheet 1.

W. F. & J. BARNES.

Scroll-Sawing Machine.

No. 207,640. Patented Sept. 3, 1878.

Fig 1

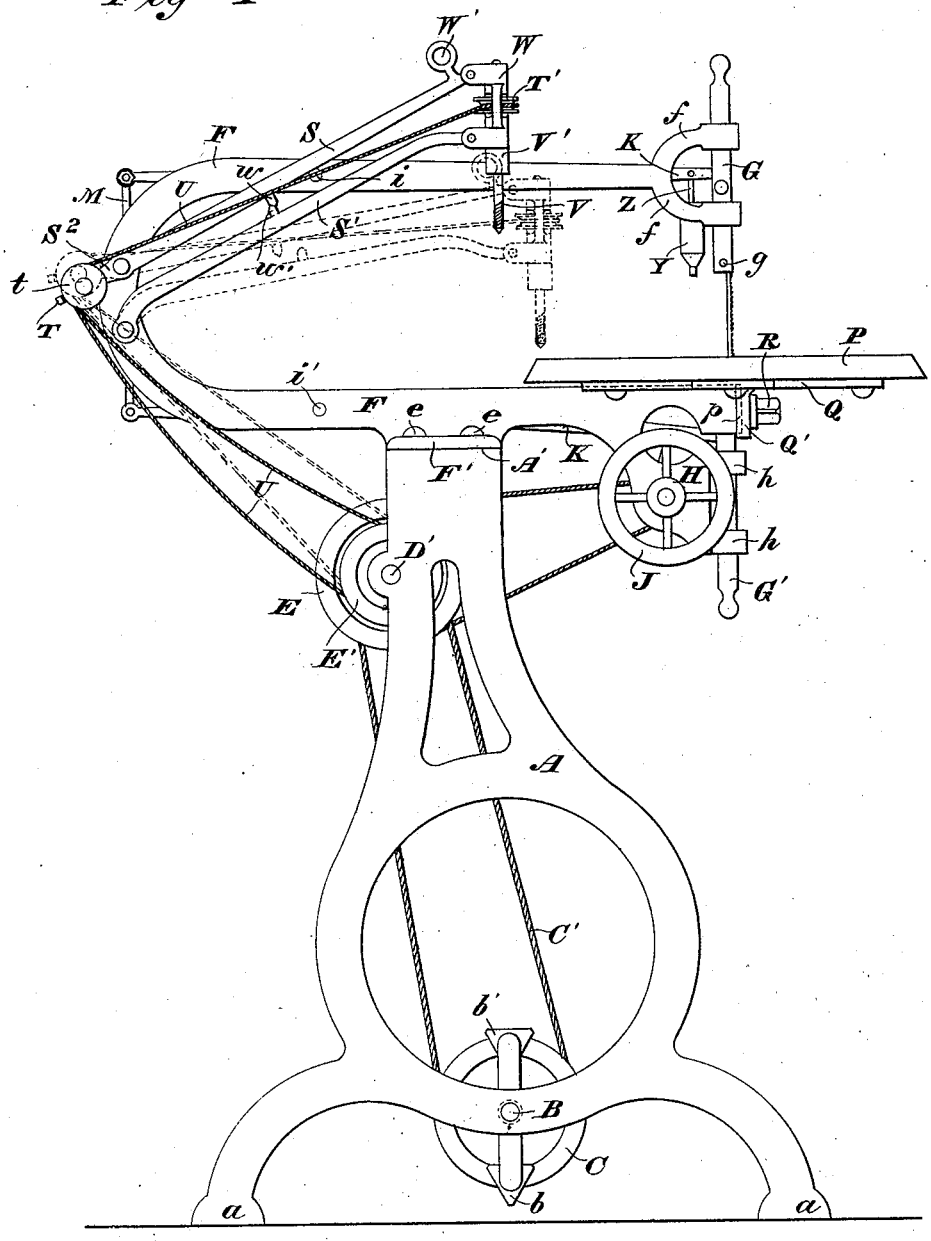

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Fig 2.

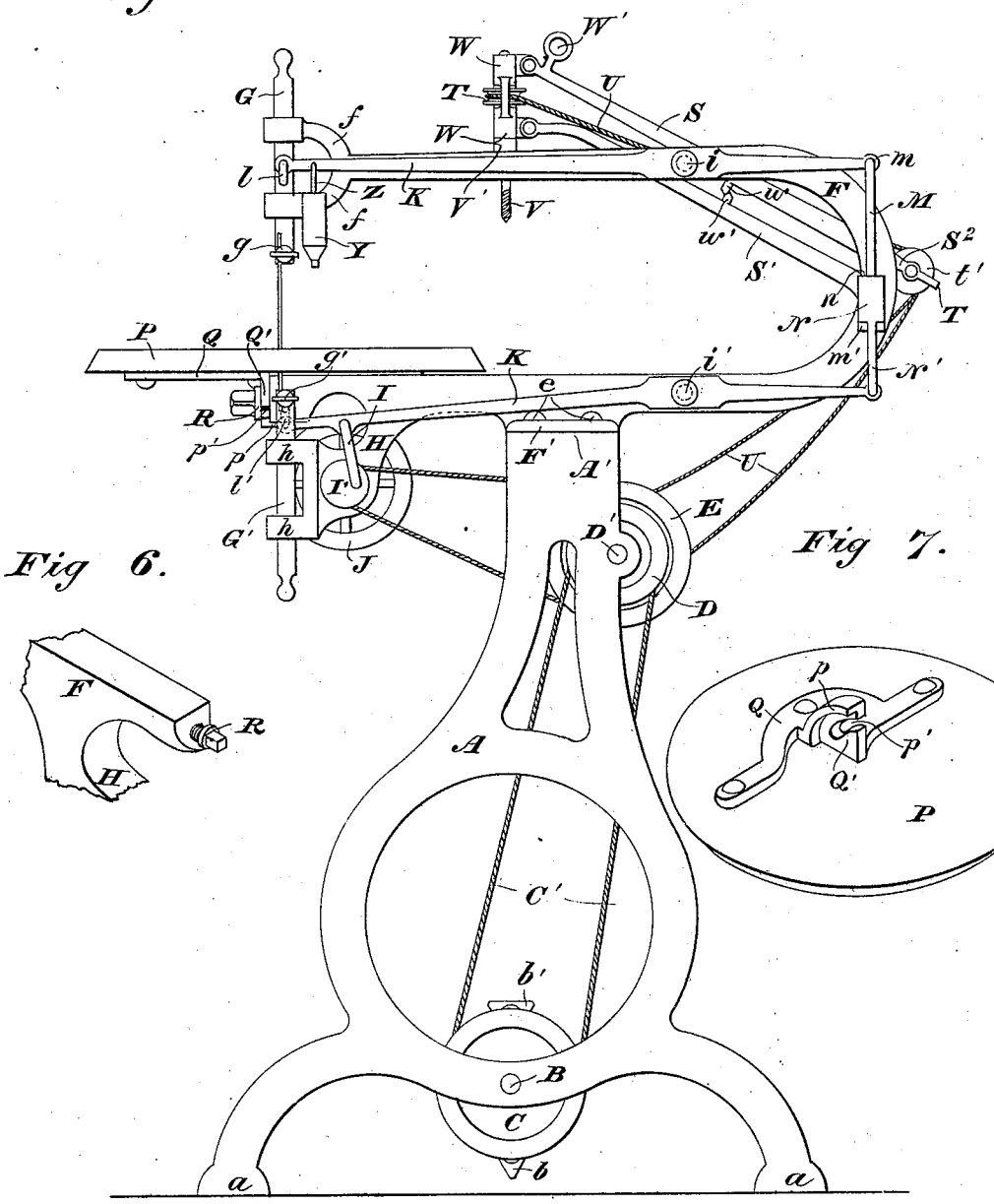

Fig 6.

Fig 7.

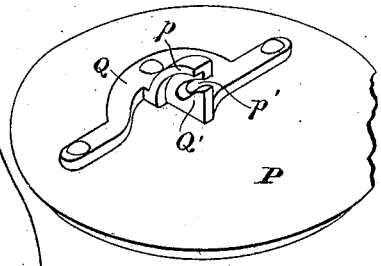

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Fig 3.

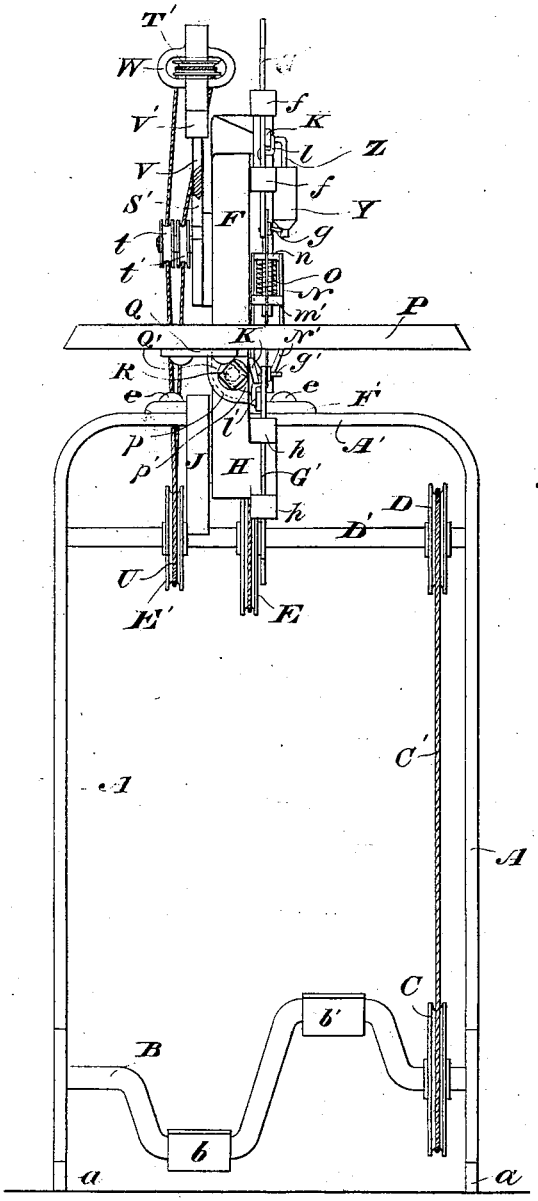


Fig 4

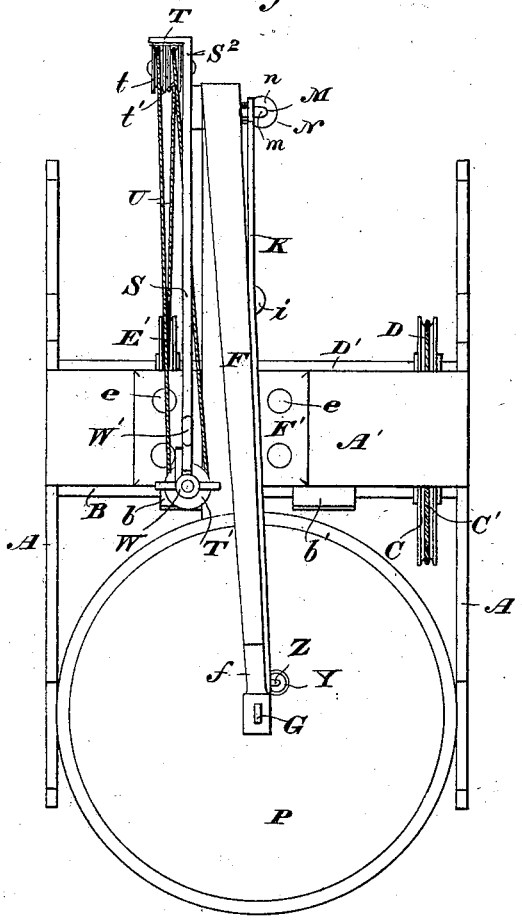
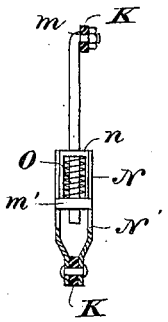


Fig 5.



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UNITED STATES PATENT OFFICE.

WILLIAM F. BARNES AND JOHN BARNES, OF ROCKFORD, ILLINOIS.

IMPROVEMENT IN SCROLL-SAWING MACHINES.

Specification forming part of Letters Patent No. **207,640**, dated September 3, 1878; application filed February 28, 1878.

To all whom it may concern:

Be it known that we, WILLIAM F. BARNES and JOHN BARNES, both of Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Scroll-Saws and Boring Attachments Thereto, of which the following is a specification:

Our invention mainly relates to a wood-working machine of the class in which a scroll-saw and a borer are mounted on a common frame or support, and driven from the same driving-shaft or prime mover.

Our improvements consist in certain peculiarities of construction of parts, and in novel combinations of devices, which will first fully be described, and then specifically designated by the claims.

The accompanying drawings show all our improvements as embodied in the best form now known to us. Obviously, however, some of our improvements may be used without the others, and in connection with machines differing in some respects from the one therein shown and hereinafter specifically described.

Figure 1 is a side elevation, showing the borer in its elevated and inoperative position in full lines, and in its depressed and working position in dotted lines; Fig. 2, a view, in elevation, of the side opposite that shown by Fig. 1; Fig. 3, a front elevation; Fig. 4, a plan or top view. Fig. 5 is a rear elevation, partly in section, showing the saw-arms connecting and straining devices. Fig. 6 is a view, in perspective, of the end of the lower fork of the saw-frame; and Fig. 7, a similar view of the under side of the work-supporting table, showing, in connection with Fig. 6, the means for adjustably attaching the table to the saw-frame.

A centrally open metal frame or supporting-stand of skeleton or scroll work rests upon feet *a* at its corners. The sides A A of the frame are connected at top by the narrow and preferably arched portion or bridge A′. A double-cranked driving-shaft, B, is mounted at its ends in bearings in the sides of the frame, near the bottom. The shaft thus spans the space between the sides of the frame, and is located wholly within it, as clearly shown by Fig. 3. Foot-rests *b b′* upon this cranked driving-shaft enable the operator to drive the machine by his feet, and thus apply power directly to the driving-wheel C, which is fast upon the shaft, near one end and close to the frame, and grooved to receive a band, C′, by which motion is communicated to a smaller grooved wheel or pulley, D, fast upon a driven shaft, D′, spanning the space between the sides of the frame, near its top, and mounted in suitable bearings, like the cranked shaft. The shaft D′ carries two band-pulleys, E and E′, the former and larger one for imparting motion to the saw, and the latter for communicating motion to a borer, as will hereinafter be explained. The shafts B and D′ are, by preference, so connected with or mounted at their ends in the sides A A of the main frame as to brace the frame in a well known way.

By the above construction and arrangement of parts it will be seen that the operator does not have to straddle the supporting frame or standard, as in using the foot-power machine patented by us March 21, 1876, No. 175,010; and that the driving-wheel, instead of being between the feet and legs of the operator, as before, is out of the way on one side, so as not to incommode or catch in the clothing of the operator. Moreover, the seat can be arranged close up to the crank-shaft, to accommodate children and persons of low stature, and the foot-rests be brought much closer together than they could be were the frame and driving-wheel between them. The legs of the supporting-frame are sufficiently far apart to firmly support the machine, thus rendering it unnecessary to have a broad-flanged base or employ screws to fasten the frame to the floor.

A ⊂-shaped saw-arm, carrying a borer-supporting frame, F, of cast-iron, is riveted or bolted by its flanged base or bracket F′ upon the top or bridge A′ of the main frame. The main frame, preferably, is made in two parts, joined together, and rigidly united at top by the bracket F′ of the frame F, through which bracket, on each side of the frame F, as well as through the top or bridge A′ of the frame, the bolts or rivets *e* pass. The main frame or stand may thus be cast in two sections, to facilitate the fitting and adjustment of the shafts B and D′, and admit of the frame being taken apart to renew the shafts and pulleys should repairs become necessary.

The upper arm of the saw-frame F is pro-

vided with forks *f f* at its outer end, which are slotted vertically to form a guideway for a reciprocating bar or plate, G, to the lower end of which plate the upper end of the saw-blade is clamped by a thumb-nut, *g*, or in any other suitable well-known way. A down-hanger or pendent arm, H, at the outer end of the lower arm of the saw-frame is bifurcated, and provided with vertical guide-openings in its forks *h h*, and receives a saw-holding plate, G′, to which the lower end of the saw is clamped by the nut *g*′, as above described. These guides in the forked ends of the saw-frame prevent any twisting or lateral movement of the saw-blade, and confine it to a vertical reciprocating movement in a straight line, which movement is imparted to it by a crank-and-pitman connection, I, between the lower saw-arm, hereinafter to be described, and a small driven pulley, I′, secured on one end of a shaft mounted in the down-hanger H, which shaft carries a balance-wheel, J, on its opposite end. The belt for driving the pulley I′ passes around it from the pulley E on the shaft D′.

The saw-arms K K are made of spring metal, as usual, and are pivoted between their middles and rear ends to the saw-frame F at *i i*′. The outer ends of the saw-arms are jointed to the guiding and clamp plates G G′ by hooks *l l*′, free to turn in the plates. By this means the parts work freely and without binding, as the rocking of the hooked connections accommodates the variations in the distance between the fulcrums *i i*′ of the saw-arms and the points at which the hooks connect them with the plates of the saw, which variations result from the fact that the outer ends of the saw-arms move in curved paths, while the saw-blade and its plates move in a straight path.

At their rear ends the saw-arms K K are united by a yielding and adjustable connection, which automatically throws up the outer end of the upper saw-arm and holds it at rest when a blade is broken and the connection between the outer ends of the arms thus severed. The heel of the upper saw-arm is clamped by a nut, or otherwise secured to the top bent end *m* of a rod, M. At its lower end this rod passes through and fits snugly, to prevent wabbling, in a hole in the cap *n* of an open-sided casing or top part, N, of a yoke, N′, and carries a cross-head, *m*′, grooved to play up and down upon the yoke-arms N′. A spiral spring, O, encircling the rod, bears at one end upon the cross-head and at the other upon the under side of the cap *n*, and acts with a tendency to draw down the rod and cause it to slide within the yoke and casing. The lower saw-arm is secured at its rear end to the bottom of the yoke, between its arms N′, by a rivet, bolt, or screw. The saw-arms being strained toward each other, when a blade is secured to them, draws the rod M upward against the force of the spring O to the limit of its upward movement. The lower edges or shoulders of the casing or top part, N, of the yoke limit the upward movement of the cross-head of the rod. When a blade breaks, the spring O forces down the rod and holds the upper saw-arm at rest as the cross-head is forced downward a sufficient distance below the bottom of the casing or shoulders, which form the lower termination of the yoke top part, N, to prevent these shoulders being brought in contact with the cross-head by the continued vibration of the lower arm. While the upper saw-arm is thus held up all flapping or lateral movement is prevented by the guideway in which the saw-blade clamp-plate works, and by the yoke, its perforated cap, the rod, and cross-head.

An adjustable and detachable work support or table, P, is mounted upon the lower arm of the saw-frame F, so that it may be rocked vertically, and clamped in an inclined position to cause the saw to make a bevel or chamfering cut. The manner of attaching and adjusting the table to a horizontal or inclined position is as follows: Upon the under side of the work-table is secured a metal bracket, Q, which preferably extends nearly across the table, to strengthen it and prevent warping and splitting. A downwardly-projecting lug or portion, Q′, of this bracket (see Fig. 7) is curved on one edge, and provided with a flange, *p*, which laps over and bears upon the rounded or correspondingly-curved side of the outer end of the lower arm of the saw-frame. From the outer edge of the lug Q′ a short curved slot, *p*′, extends inward to about the center or beyond the center of the lug. This slot is curved in an arc concentric to that of the flange *p* of the curved edge of the lug. A head or collar, R, is secured by the screw shank or bolt with which it is formed in the end of the lower arm of the saw-frame, and passes through the slot *p*′ of the lug. By loosening and tightening this nut (by means of a wrench fitting its squared head or by hand) the table may be rocked to the desired inclination, or to a horizontal position, and secured. The lug-flange fitting upon the curved end of the saw-frame arm steadies the table and strengthens its attachment.

The adjustable borer-support or carrying-frame is mounted upon the curved portion R of the saw-frame F at the juncture of the arms of this ⊂-shaped frame, and consists of two parallel arms, S S^1, pivoted at different points to the curved portion of the saw-frame, the upper arm, S, being provided with a short heel extension or portion, S^2, extending back of its pivot. Two grooved pulleys, *t t*′, are mounted side by side upon a stud-shaft projecting from this heel-extension, and to prevent the accidental displacement of the belt, an arm, T, projects across the peripheries of the pulleys at the rear. The borer-driving belt U passes from the pulley E′ on the driven shaft D′ around the pulleys *t t*′, one portion of the belt passing over one pulley, *t*, and the other over the pulley *t*′, and from thence the belt passes around a pulley, T′, rotated about a vertical axis, and imparting motion to the borer V.

The borer is mounted in a suitable chuck or holder, V′, connected with the shaft of the pulley T′ in well-known way. This pulley T′ is mounted in a frame, W, between the outer ends of the parallel arms S S¹, which arms are pivoted at the top and bottom of this chuck and pulley-frame. Short lugs *w w′* are provided, as clearly shown in Fig. 1, about midway the length of the arms S S¹ of the borer-frame. These lugs are beveled at their ends, and serve to lock the arms when elevated, as shown in full lines in Fig. 1, and hold them together with sufficient force to prevent the accidental disengagement of the lugs and dropping of the arms to the working position shown by dotted lines, Fig. 1. When the arms are elevated the belt is slackened and the borer is not rotated. The slack in the belt is caused by the slight approach of the pulleys *t t′* toward the pulley E′, as the heel S² of the arm S is rocked downward as the outer ends of the arms S S¹ are moved up. When the borer is to be operated the attendant presses down the outer end of the borer-carrying arms with sufficient force to spring the arms apart far enough to disengage or unlock the lugs *w w′*, thus tightening the driving-belt and causing the drill to rotate. The borer may be pressed upon the work by taking hold of the ring W′ and bearing down on the arms. The operator takes his seat in front of the machine and works the cranked driving-shaft with his feet.

The borer and saw, it will be seen, are driven from the same driving-shaft, the main pulley thereon, and the driven shaft; and the borer may at any time be thrown into or out of operation at the will of the operator. The one frame, F, supports both the saw-arms and the borer, and the machine, as a whole, is strong and compact, and simple in operation and construction.

A blower, to clear the sawdust from the table, consists of an open-ended tapering tube or small hollow cylinder, Y, mounted upon and preferably cast with the lower fork, *f*, of the upper arm of the saw-frame F, and a piston-rod, Z, operating a piston in the cylinder and connected with the upper saw-arm, K. By locating the blower on the lower fork of the upper arm of the saw-frame it is brought close to the table, and adapted to have its piston operated by direct connection with the upper saw-arm.

We do not claim in this application our improvements in foot-powers illustrated in the drawings and described herein, as that invention will constitute the subject-matter of a separate application.

We claim as of our own invention—

1. The connection between the heels of the saw-arms, consisting of the rod M, the yoke having a shouldered upper portion, N, perforated cap *n*, and arms N′, the cross-head on the rod M, and the coiled spring encircling said rod and bearing at its opposite ends against said cap and cross-head, substantially as and for the purposes set forth.

2. The combination, substantially as hereinbefore set forth, of the saw-frame F, the saw-arms pivoted thereto, the rod connected with the heel of the upper saw-arm, the yoke connected with the heel of the lower saw-arm and having a shouldered upper portion, the cross-head on the lower end of the connecting-rod, and the spring between the top of the casing or upper portion of the yoke and said cross-head.

3. The swinging borer support or frame, consisting of the combination of the separately-pivoted parallel arms, the heel-extension of one of said arms to support the pulleys, the chuck-frame to which the outer ends of said arms are pivoted, and the interlocking lugs on the arms, substantially as and for the purpose set forth.

4. The combination, substantially as hereinbefore set forth, of the driven shaft, the pulley E′ thereon, the saw-frame F, the swinging parallel arms S S¹ of the borer-supporting frame, the heel-extension of said frame, the pulleys *t t′*, the chuck-frame, and the pulley thereon.

5. The combination of the main frame, the driven shaft, its pulleys E′, the saw-frame F, the swinging borer-frame pivoted to the saw-frame, and the borer operated from the pulley E′ by the belt U, these members being constructed and operating substantially as hereinbefore set forth, whereby the rotation of the borer may be stopped by throwing up the frame to slacken the belt, as described.

In testimony whereof we have hereunto subscribed our names.

WILLIAM F. BARNES.
JOHN BARNES.

Witnesses:
FRANK D. EMERSON,
JNO. W. HEPBURN.