(No Model.) 3 Sheets—Sheet 1.

A. FRAZER.

BORING MACHINE.

No. 524,138. Patented Aug. 7, 1894.

FIG. 1.

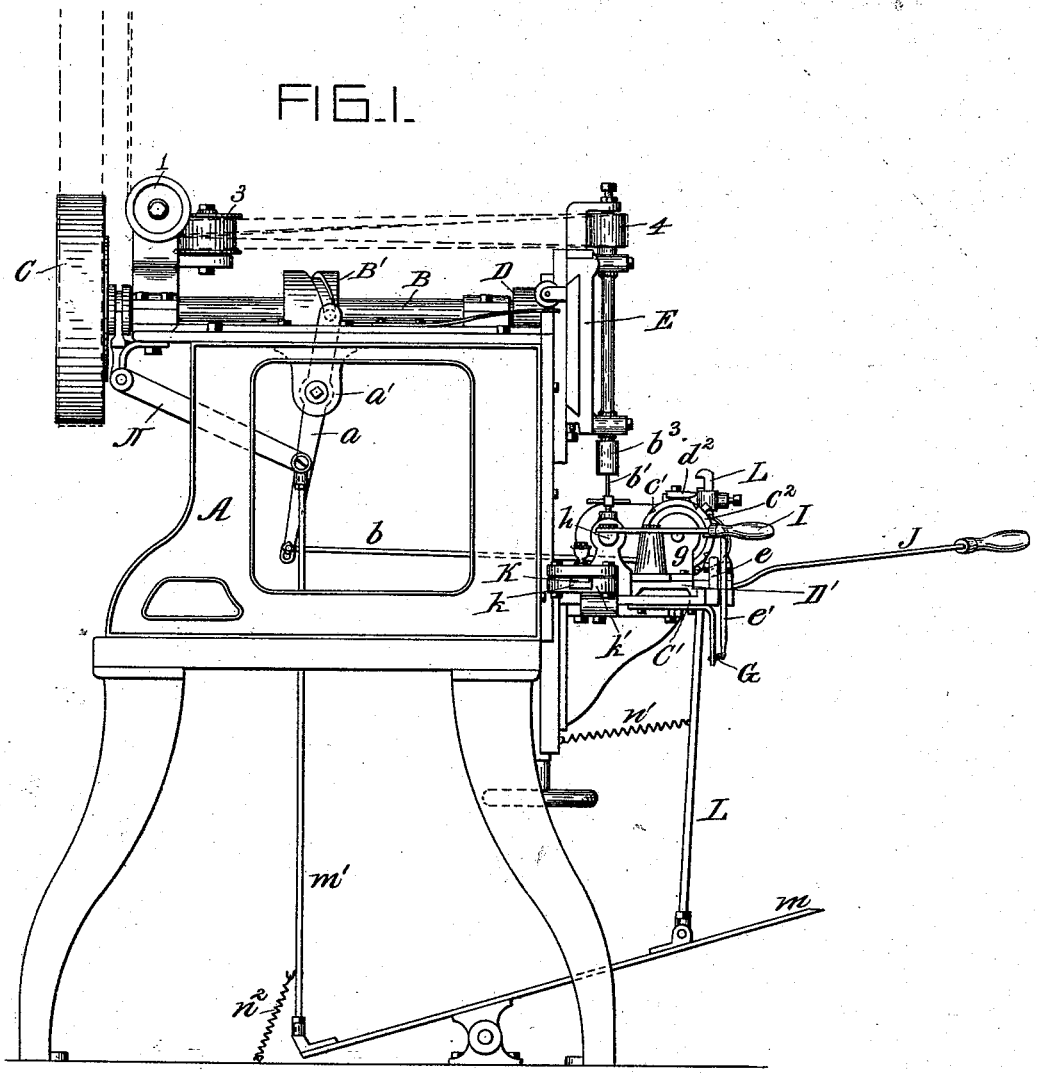
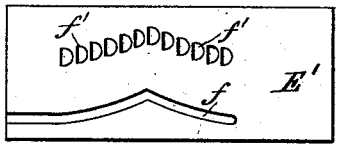


FIG. 8.



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his Attorney.

(No Model.) 3 Sheets—Sheet 2.

A. FRAZER.

BORING MACHINE.

No. 524,138. Patented Aug. 7, 1894.

FIG. 2.

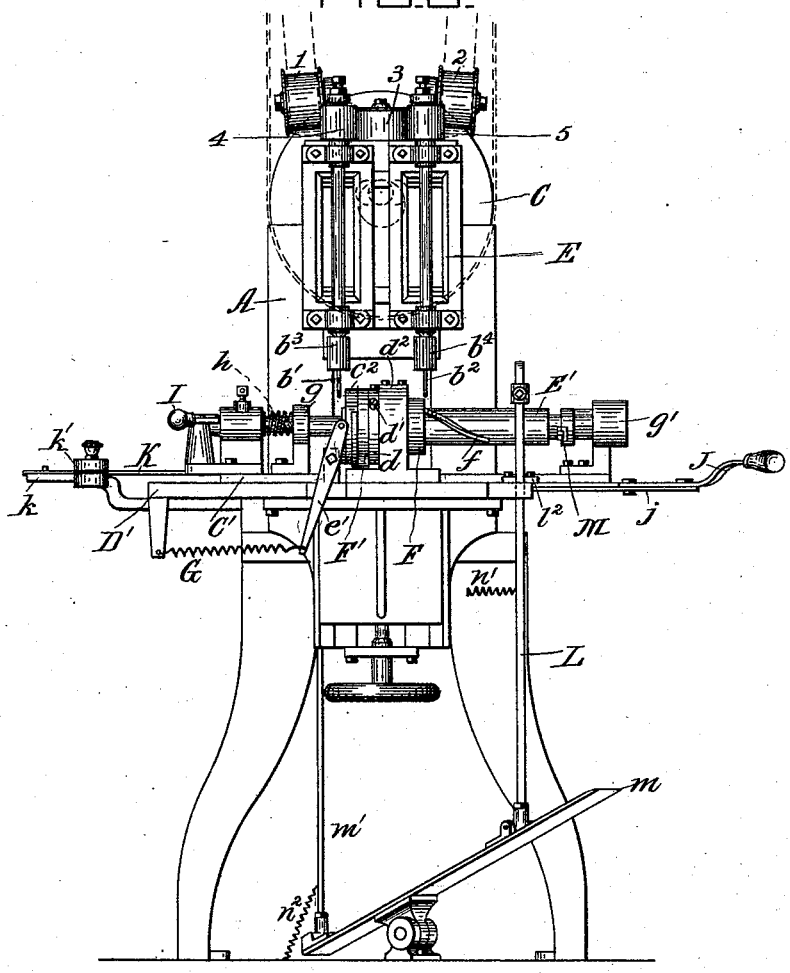
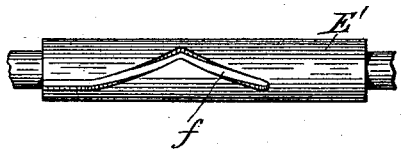


FIG. 7ª



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(No Model.) 3 Sheets—Sheet 3.

A. FRAZER.

BORING MACHINE.

No. 524,138. Patented Aug. 7, 1894.

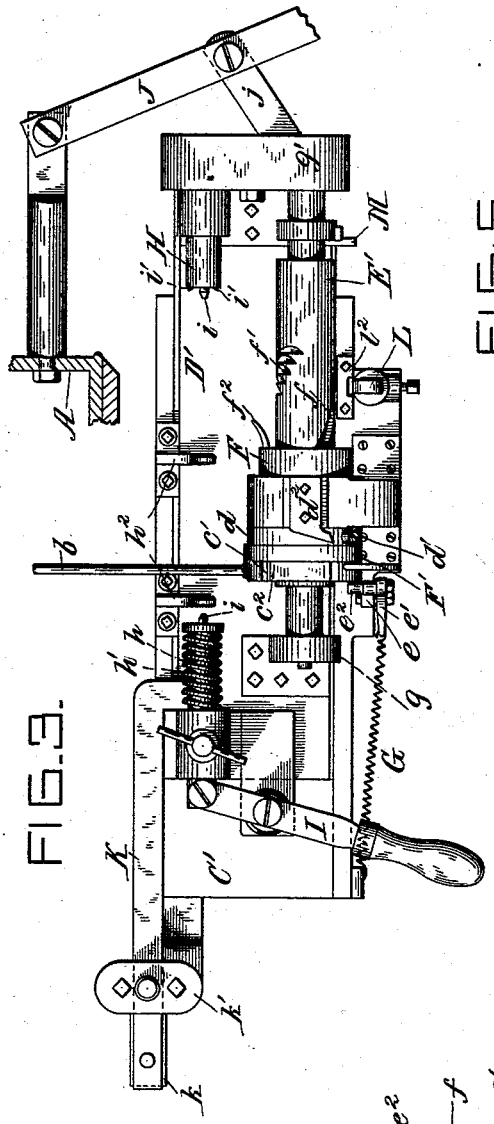

FIG. 3.

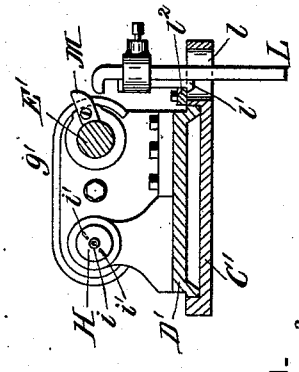

FIG. 5.

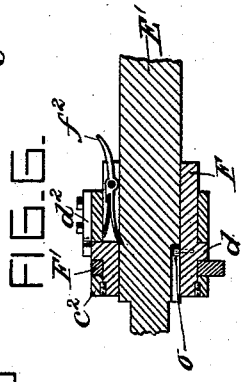

FIG. 6.

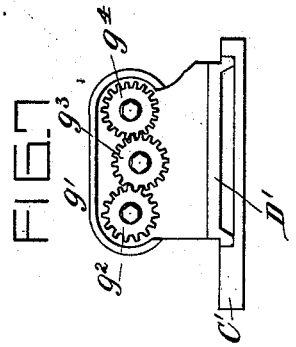

FIG. 7.

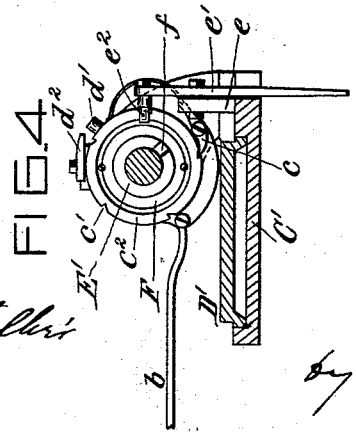

FIG. 4.

FIG. 8.

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UNITED STATES PATENT OFFICE.

ALEXANDER FRAZER, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO THE GOSHEN SWEEPER COMPANY, OF SAME PLACE.

BORING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 524,138, dated August 7, 1894.

Application filed November 8, 1892. Serial No. 451,372. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER FRAZER, a citizen of the United States, residing in the city of Grand Rapids, county of Kent, and State of Michigan, have invented certain new and useful Improvements in Boring-Machines, of which the following is a full, clear, and accurate description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of boring machines more particularly used in the manufacture of brushes, and has for its object to provide a machine combining cheapness and simplicity in construction with rapidity in its operation.

In the drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a front elevation of the same. Fig. 3 is a plan of the sliding table and attached mechanism. Figs. 4, 5, 6, 7 and 7^a are details of the same. Fig. 8 is an isometrical view of the templet. Fig. 9 shows the blank and perforated rolls.

Similar letters and figures of reference indicate identical parts.

A is the frame upon which is mounted in suitable bearings a shaft B carrying at one end the friction pulley C and at the other end the eccentric D operating the sliding bit carrier E, which moves in slides upon the front of the frame A and receives its upward and downward movement through the eccentric D operating within a slot upon the back of the bit carrier as shown in dotted lines Fig. 2. A cam B′ is mounted upon the shaft B and through the lever a pivoted upon a lug a' on the frame A imparts a reciprocating motion to the link b as will be hereinafter described. The bits b' and b^2 in the bit stocks b^3 and b^4 receive their rotary motion by means of a belt shown in dotted lines Figs. 1 and 2 passing around pulleys 1, 2 and 3 mounted upon a bracket secured to the frame A, and around pulleys 4 and 5 upon the bit stocks b^3 and b^4.

Rigidly secured to a bracket upon the front of the frame A is a table C′ provided with flanges upon its front and rear sides to act as guides for the slides D′. A shaft E′ revolves within a sleeve or hollow shaft J journaled upon the table C′ and has upon its surface a groove f which in this instance is given a double incline forming an obtuse angle along the surface of the shaft; directly opposite the groove f upon the surface of the templet E′ are notches f' arranged to correspond with the direction of the groove f and adapted to engage with a spring pawl f^2 secured within a slot in the hollow shaft F. These notches are ratchet shaped and form a sunk ratchet rack. The notches c' in the collar c^2 correspond in number with the perforations in the brush roll in a circle upon its surface. A pin o preferably provided with a friction roller secured to the inside of the hollow shaft F moves within the groove f of the shaft E′ and while rotating the latter consonant with the movement of the sleeve or hollow shaft F it also serves a further function by reason of the inclination of the groove f.

A loose collar F′ mounted upon the sleeve or hollow shaft F is enlarged at its lower periphery and has secured to it one end of the link b, and a spring pawl c engaging with notches c' in a collar c^2 rigidly secured to the hollow shaft F in any suitable manner. A flange d forming part of the sleeve or hollow shaft F has a pin preferably provided with a friction roller d' secured to it and adapted to engage with the cam face of the plate d^2. The said plate is secured to the top of the journal of the sleeve F. Pivoted to a standard e upon the table C′ is a lever e' having upon its upper end a finger carrying a pin provided with a friction roller e^2 which bears against the face of the collar c^2 and holds the sleeve F in its normal position by the tension of the spring G as will be readily understood.

The ends of the shaft E′ are journaled at g and g' upon the slide D′. A gear g^2 is mounted upon the end of the shaft within the journal g' and meshes with an idler gear g^3 secured to the journal g'; the idler gear g^3 in turn meshes with a gear g^4 mounted upon the journaled end of a short shaft H which has consequently a simultaneous movement with the shaft E′.

A sliding clamping bar h in a bearing upon the slide D′ is held in a normal position by a coiled spring h' as shown; a lever I serves to draw back the bar h. Pins i upon the shaft H and bar h hold the brush roll while under

the bits. Small projections i' upon the end of the shaft H cause the brush roll or object to be perforated to rotate with the shaft H. Rests h^2 are bolted to the table C′ for the purpose of supporting the brush roll against the downward pressure of the bits.

To draw the slide D′ back to its normal position I use a lever J, one end of which is pivoted to a projection upon the side of the frame A and has bolted to it an arm j secured to the under side of the slide D′ as shown in Fig. 3.

A bar K bolted to the slide D′ has upon its outer end a stop k which limits the movement of the slide D′ when pulled back by the lever J, by contact with the guide k' through which the bar K moves; the guide k' being fastened to the table C′. To stop the movement of the slide D′ and attached mechanism, a tripping rod L guided within a slot t in the table C′ is held by the finger t' catching beneath the detent t^2 upon the table C′ until tripped and thrown out of engagement with the detent by the action of a lug M upon the shaft E′. The lower end of the tripping rod L is connected to a treadle m pivoted to the floor and to which is fastened the rod m' operating the arm N used to throw the friction pulley C in and out of engagement. Springs n', n^2 are employed to lend firmness to the action of the tripping rod L and treadle m.

In operation, the necessary power being imparted to the machine through the belts upon the pulleys shown in dotted lines, the slide D′ being in the position shown in Fig. 3, the bar h is drawn back to admit of the placing of the blank brush roll in position between the shaft H and the bar h, the pressure of the spring h' holding the roll firmly against the shaft H and the projections i' upon its end. The treadle m is then pushed down, the finger t' upon the tripping rod L catching beneath the detent t^2, at the same time the friction pulley C is thrown into engagement by the rod m' and arm N, causing the shaft B to revolve with the cam B′ and eccentric D. The eccentric D forces the bit carrier downward and the bits are brought into contact with the brush roll, perforating it to the desired depth. The carrier is then moved upward by the eccentric D, when the cam B′ through the arm a forces the link b backward causing the loose collar F′ to move with it, and the sleeve F is partially rotated by reason of the pawl c engaging one of the notches c' in the rigid collar c^2. This rotary movement of the sleeve is communicated to the shaft E′ by the pin o and thence to the work support which is in consequence given a proportional partial revolution. This operation is continued until the next partial revolution will bring the work back to the point of starting. During this last partial rotation the pin d' upon the sleeve comes in contact with the cam face of the plate d^2 and the sleeve is moved endwise against the tension of the spring G. During this movement the pawl f^2 carries the shaft E′ and slide D′ along with it. As soon as the pin d' passes the cam face of plate d^2 the spring G returns the sleeve to its former position. The friction upon the slide D causes the work support and shaft E′ to remain in the position to which they have been moved while the sleeve moving along the shaft E′, the latter is turned slightly by reason of the pin traversing a short distance in the inclined groove and the pawl f^2 is brought in engagement with another tooth of the ratchet rack of the said shaft. This moves the work slightly under the bits so that on being again depressed they will not enter the work directly opposite or in line with the perforation first made therein.

The intermittent rotation of the work is continued the bits being operated between every partial revolution of the same and the work advanced longitudinally after each complete revolution of the shaft with the consequent supplementary movement of the work to prevent the direct alignment of the perforations until the work is completely perforated. The lug m of the shaft E′ then reaches and strikes the tripping rod L throwing the latter out of engagement with the detent t^2, the rod m' and arm N being pulled downward by the spring n^2, throws the friction pulley out of engagement, thus stopping the parts operated by the action of the cam B′ and eccentric D. The operator then raising the spring dog f^2 out of engagement with the rack f', draws the slide D′ back to its first position by means of the lever J. The perforated roll is then removed and a blank one substituted, when the operation of the parts is repeated as hereinbefore described.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A boring machine comprising among its members, a work support, means for turning said work support intermittently by partial revolutions, a reciprocating boring device, and means for operating the same between the partial revolving movements of the work support and means for moving the work support longitudinally after each complete revolution, substantially as described.

2. A boring machine comprising among its members, a work support, means for turning said work support intermittently by partial revolutions, a reciprocating boring device and means for operating the same between the partial revolving movements of the work support, means for moving the work support longitudinally and slightly turning the same at the close of each complete revolution, substantially as described.

3. In a boring machine the combination with the work holder, of a shaft geared therewith, a sleeve loosely mounted on said shaft, means for turning said sleeve intermittently by partial rotations, means for moving the sleeve longitudinally of the said shaft, the said shaft and sleeve being connected by a pin and inclined groove whereby the shaft is

rotated intermittently and the longitudinal movement of the sleeve gives a slight rotary movement of the shaft in respect to said sleeve, substantially as described.

4. In a boring machine the combination with the work support, of a shaft geared with said support having a ratchet rack connected therewith, a sleeve loosely mounted upon the said shaft and provided with a pawl engaging said rack, means for intermittently turning said sleeve by partial revolutions, means for moving the said sleeve longitudinally of the said shaft, the said sleeve and shaft being connected by a pin and inclined groove, whereby the work support is intermittently rotated by partial revolutions and is given an intermittent longitudinal progressive movement and is slightly turned with such movement, substantially as described.

5. The combination with a shaft, of a sleeve mounted upon said shaft, a pawl and ratchet rack and pin and inclined groove connecting the two, an actuating pawl and ratchet for said sleeve, a stationary cam and a pin connected with the said sleeve for engaging said cam, substantially as described.

6. The combination with a shaft having an inclined groove and sunk ratchet rack, of a sleeve loosely mounted on said shaft and having a pin engaging the groove, and a pawl engaging the rack of the shaft and means for intermittently moving the sleeve longitudinally at each revolution of the same whereby the two are rotated together and the shaft moved longitudinally and axially as to the sleeve, substantially as described.

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