

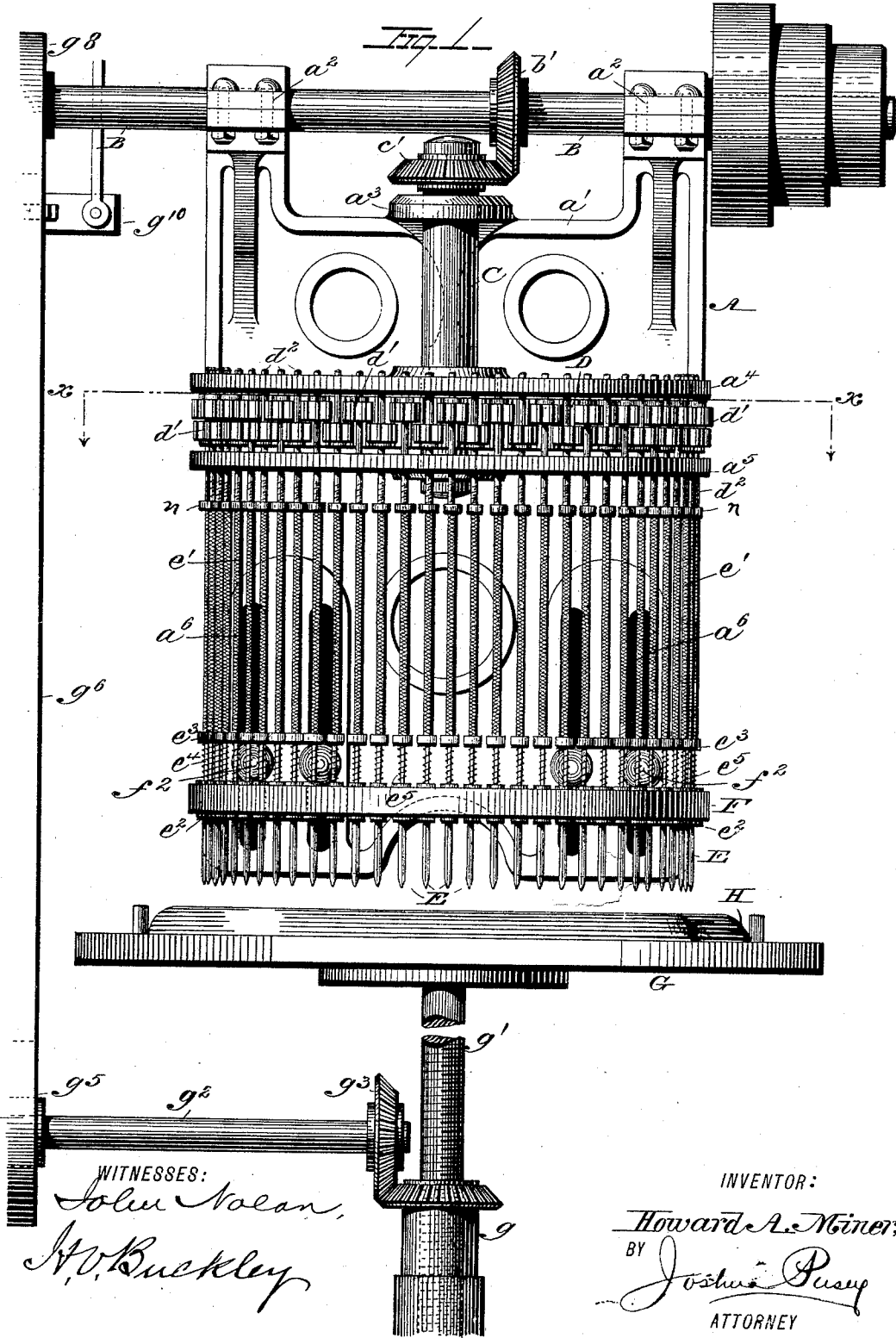
(No Model.)

3 Sheets—Sheet 1.

H. A. MINER.  
BORING MACHINE.

No. 433,577.

Patented Aug. 5, 1890.



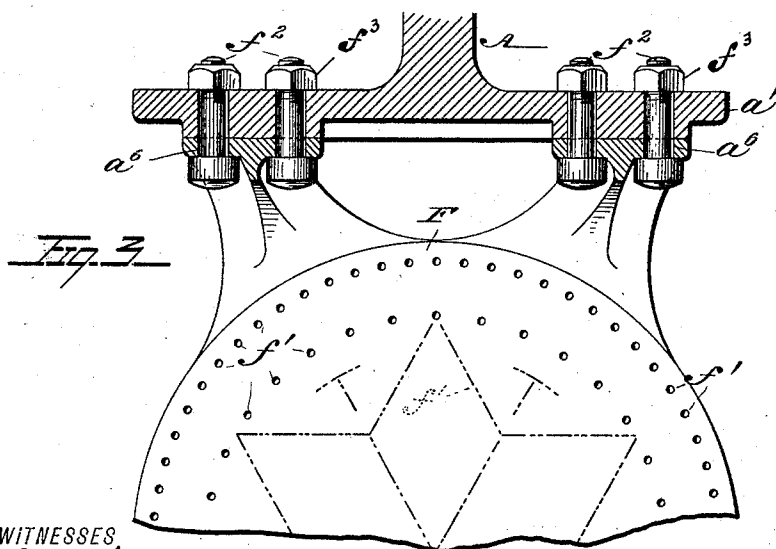
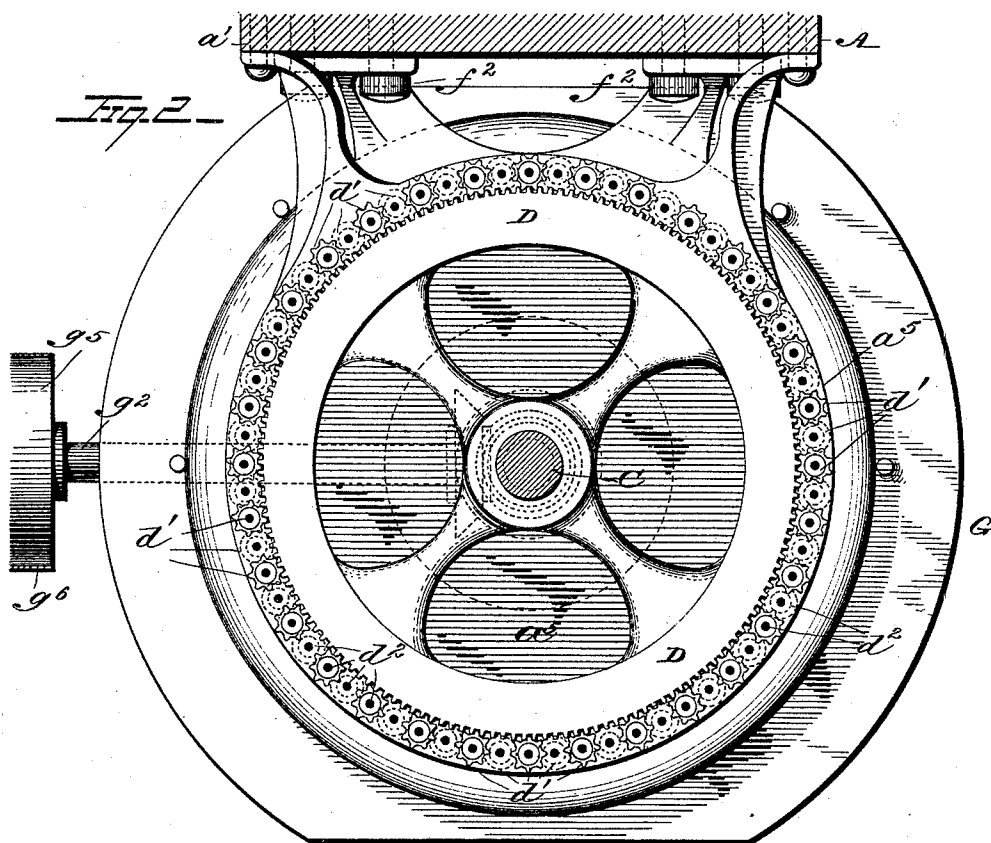
(No Model.)

3 Sheets—Sheet 2.

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No. 433,577.

Patented Aug. 5, 1890.



WITNESSES  
John Nolan.  
R. W. Buckley

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By His Attorney  
*Joshua Reese*

(No Model.)

3 Sheets—Sheet 3.

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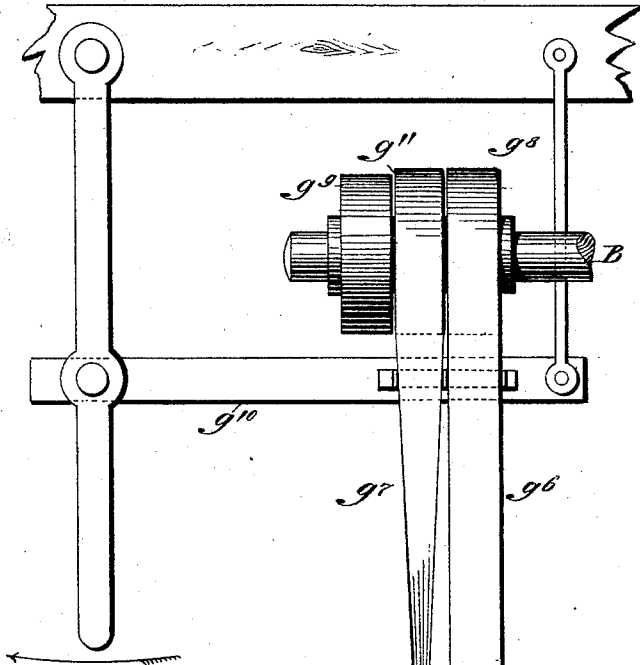
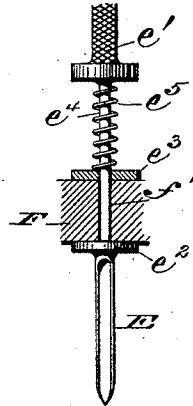
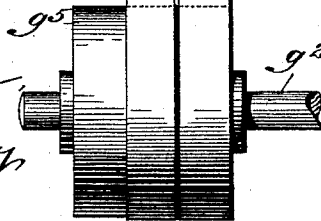


Fig. 4

Fig. 5



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

HOWARD A. MINER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO GEORGE W. LORD, OF HADDONFIELD, NEW JERSEY.

## BORING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 433,577, dated August 5, 1890.

Application filed January 21, 1889. Renewed January 13, 1890. Serial No. 336,719. (No model.)

*To all whom it may concern:*

Be it known that I, HOWARD A. MINER, a citizen of the United States, residing at the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Boring-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a side elevation. Fig. 2, Sheet 2, is a horizontal section, as on the line  $x x$ , Fig. 1. Fig. 3 is a plan of one side of the "former" or guide-plate with connections. Fig. 4, Sheet 3, is an elevation of the feed-operating mechanism. Fig. 5 is a detail view of one of the boring-bits and adjuncts.

The nature of this invention is a boring-machine of novel construction, particularly, though not exclusively, designed for boring in chair-seat frames the line or series of small vertical holes through which the edges of the cane or rattan seats are laced and tied; and it may be generally stated to consist in the combination of a large central gear-wheel, a series or train of pinions engaging therewith, a like series of boring-bits, each of which is independently connected with one of the pinion-shafts by means of a flexible shaft or coupling, and a perforated plate or former arranged with relation to said bits and adapted to receive and guide the same, together with a vertically-adjustable feed-table for supporting a seat-frame with reference to said former, whereby upon motion being imparted to the central gear the peripheral train of pinions, with their respective bits, will be simultaneously rotated, and a series of holes corresponding to the prescribed position or configuration of those in the guide-plate or former will be drilled in the seat-frame. By means of the flexible shaft-connections the bits may be adapted to the boring of holes for any shape or style of chair-seat which may be perforated in the guide-plate.

The invention consists, also, in various details and combinations, which will be hereinafter fully explained, and pointed out in the claims.

Referring to the annexed drawings, A represents the frame-work of the machine, consisting of a substantial wall or bed plate  $a'$ , which

is provided at its upper end with journal-boxes  $a^2 a^3$ , and below the same with two adjacent circular bearing-plates  $a^4 a^5$ . Within the boxes  $a^2$  is journaled a horizontal shaft B, at the middle of which there is keyed a bevel-gear  $b'$ , that engages with a similar gear  $c'$  upon a central vertical shaft C. This latter shaft passes through the box  $a^3$  and bearing-plates  $a^4 a^5$ , and between the latter, upon shaft C, is mounted a large broad-faced gear-wheel D, the teeth of which engage with those of a circular series or train of pinions  $d'$ , whose shafts  $d^2$  are journaled concentrically within and near the edge of said plates.

It will be observed that the pinions  $d'$  are mounted in such manner upon their shafts as to alternately engage with the upper and lower parts of the face of the gear D. The object of this construction is to permit the employment of a greater number of such pinions than could be done if they were all disposed in the same horizontal plane.

The shafts of the pinions  $d'$  extend below the under bearing-plate  $a^5$ , and to each of the same a boring-bit E is connected by means of a flexible shaft or coupling  $e'$ .

The bits E are inserted within a series of vertical holes  $f'$  in a lower guide plate or former F, from the under side of the latter shoulders or flanges  $e^2$ , which are formed on or secured to said bits, impinging against the former F, and determining the upward movement of the bits. A loose washer  $e^3$  is then slipped upon each of the bit-tangs  $e^4$ , and a spiral spring  $e^5$ , which holds the bit up in place, is interposed between the washer and the end of the flexible shaft with which said bit-tang is connected. (See Fig. 5.)

The function of the former-plate F is to direct and guide the bits while operating, as hereinafter explained.

Mounted upon a central screw-rod  $g'$ , below the bits, is a table G, which is adapted to support the seat-frame when the latter is being fed to the drills.

The construction of the feed mechanism is as follows:  $g$  is an internally-threaded collar or nut through which the screw-rod  $g'$  passes and with which it engages, the direction in which said nut is rotated determining the upward or downward movement of the screw-

rod and the feed-table thereupon.  $g^2$  is a horizontal shaft carrying at its inner end a bevel-gear  $g^3$ , which engages with a similar gear upon said collar or nut. On shaft  $g^2$  is also mounted a broad-faced pulley  $g^5$ , which is alternately driven in opposite directions by means of a straight belt  $g^6$  and a crossed belt  $g^7$ , which pass around two pulleys  $g^8$ ,  $g^9$ , respectively, upon the upper or main shaft B, and which belts are thrown into or out of action as desired by means of a shifting-bar  $g^{10}$ , in connection with an intermediate loose pulley  $g^{11}$ .

The above is a general description of the construction of the machine. Its operation is briefly as follows:

Motion is transmitted from some suitable source of power to the main shaft B, which actuates the gear D, the pinions  $d'$ , and the drilling devices, as above described. A seat-frame H is placed upon the table G, and the belt  $g^7$  transferred to the pulley  $g^8$ , which thus imparts its motion to the shaft  $g^2$ . Said shaft, through the gears  $g^3$   $g^4$ , rotates the nut upon the screw-bar  $g'$ , thereby raising the latter and feeding to the drills the work upon the table G. When the holes are suitably bored in the frame, the belt  $g^7$  is shifted upon the loose pulley  $g^{11}$ , thus transferring to the fixed pulley  $g^9$  the other belt  $g^6$ , which reverses the movement of the feeding mechanism and lowers the feed-table with the drilled seat-frame thereon. This frame is removed, another substituted therefor, and the operation repeated, and so on successively. The guide-holes  $f'$  in the former F may be so arranged as to coincide with seat-frames of various sizes and configurations, inasmuch as the bits, by reason of their flexible connections, may be directed to and guided at various points in said former. A single former, with several different series of perforations therein, may be provided; or, if desired, there may be employed a separate and distinct former for each different pattern or size of seat-frame, said former being, of course, readily attachable to and detachable from the machine, as occasion may require. As a means to provide for such attachment and detachment of the separate formers, and at the same time to render them capable of adjustment vertically, so that the various forms or sizes of seat-frames may be properly disposed with reference to the boring-bits, I furnish the bed-plate  $a'$ , at each side thereof, with vertical slots  $a^6$ , through which pass from the former-plate F bolts  $f^2$ , upon whose ends are screwed jam-nuts  $f^3$ . It will be seen that by unscrewing these nuts the former F may be readily adjusted as desired, or that it may be removed and another having a differently perforated pattern substituted therefor. The sometimes peculiar configuration of this pattern in the former may render it necessary to shorten or lengthen one or more of the flexible shafts. To effect this I merely screw-thread the lower parts of the pinion-shafts  $d^2$ , and connect thereto the

upper ends of the flexible shafts  $e'$  by means of nuts  $n$ , which are fixed on the ends of said latter shafts. (See Fig. 1.)

I remark that for boring perforations which are at or grouped around an inner or central point, as in the wooden seats of chairs, (*vide* dotted lines in Fig. 3.) brush-backs, and like articles, I merely lengthen the central shaft C and key thereto a smaller gear or gears, with which engage one or more series of pinions connected with boring-bits and operating in the same manner as the first-described mechanism.

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

1. In a boring-machine, the combination of the supporting-frame, the central shaft C, the mechanism for rotating the same, the gear-wheel D, the series or train of pinions engaging therewith, the boring-bits, the flexible shafts coupling said pinions and bits, and the perforated former or guide-plate, all combined, constructed, and adapted to operate substantially as and for the purpose set forth.

2. The combination, in a boring-machine, of the supporting-frame, the central shaft C, the mechanism for rotating the same, the gear-wheel D, the series or train of pinions engaging therewith, the boring-bits, the flexible shafts coupling said pinions and bits, the adjustable former, and the devices, such as the bolts, nuts, and slotted bed-plate, for the adjustment of said former, substantially as described.

3. The combination of the supporting-frame, the central shaft C, the mechanism for rotating the same, the gear-wheel D, the series or train of pinions engaging therewith, the boring-bits, the flexible shafts coupling said pinions and bits, the perforated former or guide-plate, the feed-table, and the devices for actuating the same, substantially as described.

4. In a boring-machine for the purpose described, the combination of the supporting-frame, the central shaft C, the mechanism for rotating the same, the gear-wheel D, the series or train of pinions engaging therewith, the boring-bits provided with the flanges and tangs, the flexible shafts or couplings, the compression-springs, and the perforated former or guide plate, substantially as described.

5. The combination, in a boring-machine, of the supporting-frame, the central shaft C, the mechanism for rotating the same, the gear-wheel D, the series or train of pinions engaging therewith, the screw-threaded pinion-shafts, the flexible shafts, the set-nuts thereon, the boring-bits, and the perforated former or guide-plate, substantially as described.

6. In a boring-machine of the character described, the combination of the supporting-frame, the horizontal driving-shaft, the bevel-gear  $b'$ , the pulleys  $g^8$ ,  $g^9$ , and  $g^{11}$ , the central shaft C, its gears  $c'$  and D, the bearing-plates

$a^4$   $a^5$ , the series of pinions journaled in and  
between said plates and engaging with said  
gear D, the flexible shafts, the boring-bits, the  
perforated former, the feed-table, the screw-  
5 rod  $g'$ , the nut  $g$ , its gear, the shaft  $g^2$ , its  
gear  $g^3$ , the pulley on said latter shaft, the  
belts  $g^6$  and  $g^7$ , and the shifting-bar  $g^{10}$ , all  
substantially as and for the purpose specified.

In testimony whereof I have hereunto affixed  
my signature this 24th day of December, A. 10  
D. 1888.

HOWARD A. MINER.

Witnesses:

JOSHUA PUSEY,  
JOHN NOLAN.