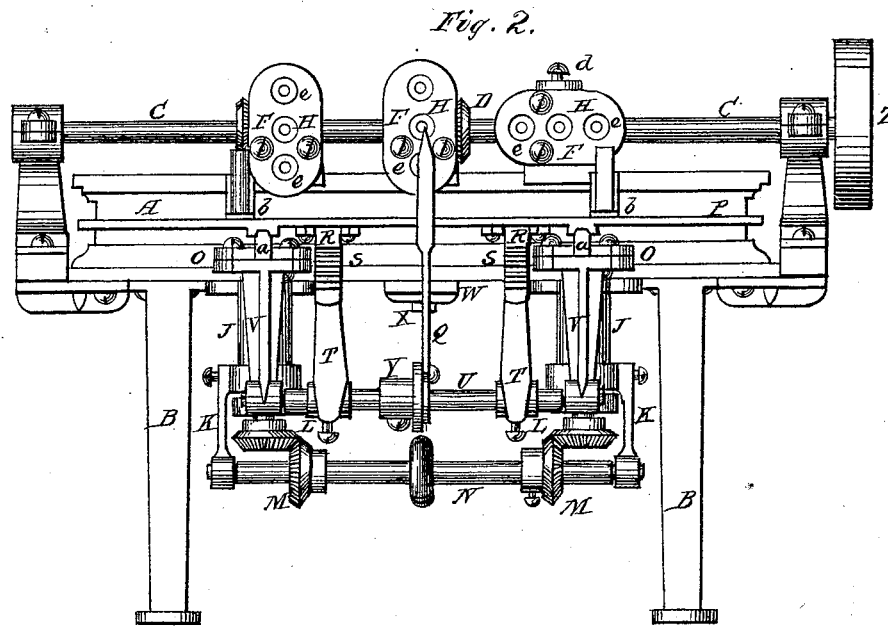
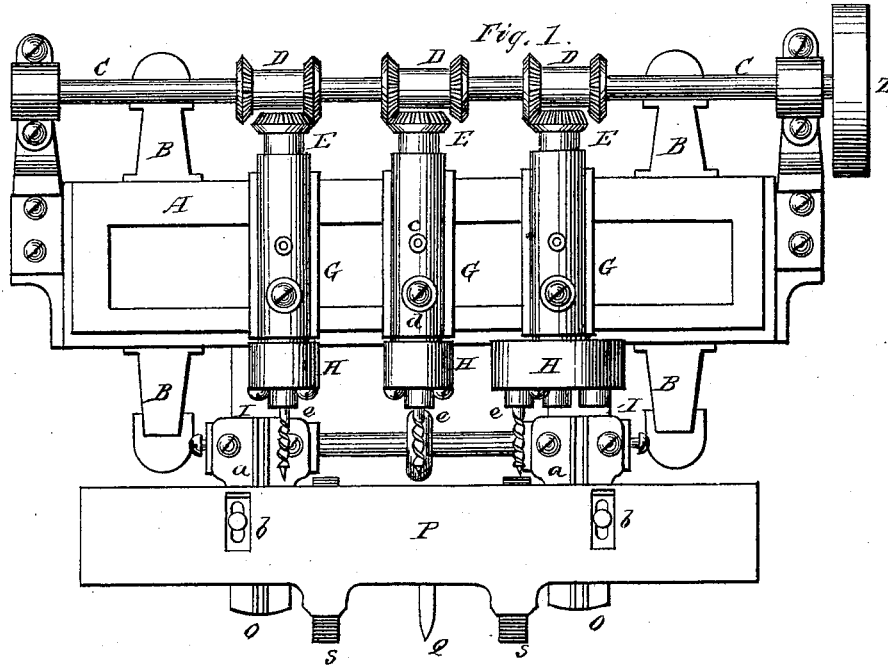


C. G. CROSS. Wood-Boring Machine.

No. 159,749.

Patented Feb. 16, 1875.



WITNESSES.

E. A. West.
Chas. Bond -

Christopher G. Cross.
INVENTOR.

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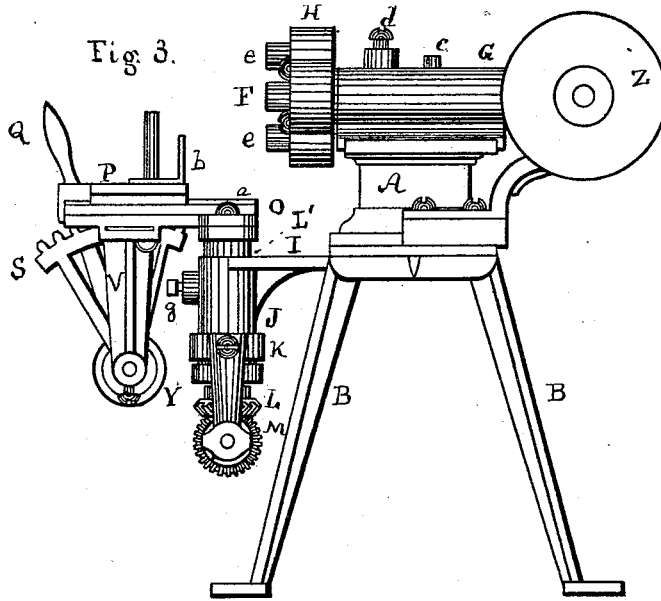


Fig. 4.

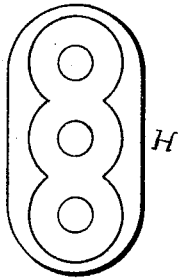
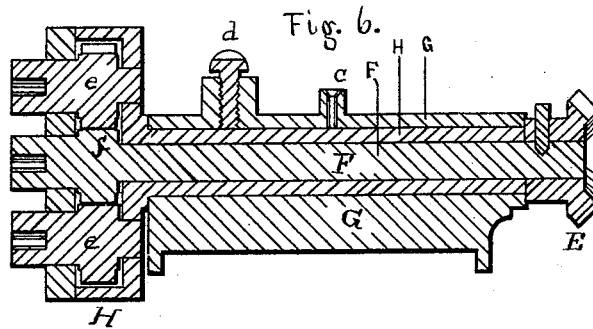
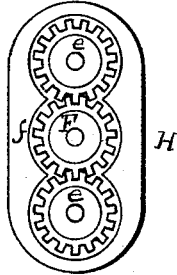


Fig. 5.



Witnesses:

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Wm. Bond

Christopher G. Cross
Inventor:

UNITED STATES PATENT OFFICE.

CHRISTOPHER G. CROSS, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN WOOD-BORING MACHINES.

Specification forming part of Letters Patent No. **159,749**, dated February 16, 1875; application filed December 8, 1874.

To all whom it may concern:

Be it known that I, CHRISTOPHER G. CROSS, of the city of Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Boring-Machines, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a top or plan view; Fig. 2, a front elevation; Fig. 3, an end view; and Figs. 4, 5, and 6, details.

The object of my invention is to provide a wood-boring machine with a sufficient number of heads for holding and operating the bit holders or stocks, to enable me to bore a long series of holes, and to so arrange the heads containing the bit holders or stocks that holes may be bored in regular or irregular lines, and at regular or irregular intervals; and its nature consists in a novel arrangement of the gear for operating the bits; in the construction and arrangement of the heads holding the gear-wheels; in an improved arrangement for operating the same; and in an improved device for operating the feed-table.

In the drawings, A represents the frame; B, the legs or supports thereof; C, the main or driving shaft; D, the gear-wheels on said shaft; E, the gear-wheels on the rear ends of the shafts for driving the bits or augers; F, the bit-shafts; G, the cylinders or frames through which the bit-shafts pass; H, the heads, containing the additional bit-stocks; I, brackets or arms projecting from the front of the main frame, upon which the feed-table and its operating mechanism are supported; J, the tubular portion of the bracket I; K, the collars, provided with arms from which the adjusting-shaft is supported; L, the gear-wheels on the lower ends of screw-shafts, which screw into the tubular sections L', to raise or lower the feed-table; M, the gear-wheels for operating the wheels L; N, the shaft; O, arms or brackets fastened to the top of the tubular sections L', and upon which the feed-table P rests; Q, the lever for advancing or receding the feed-table; R, racks on the under surface of the feed-table; S, toothed segments engaging with the racks R; T, spokes of the segment-wheels; U, the shaft to which the segment-wheels are attached; V, hangers depending from the

brackets O, into which the shaft U is journaled; W, cross-plates for holding the tubes or frames G in position when adjusted; X, nuts on the rods connecting the plates W with the frames G; Y, the collar on the shaft U, to which the lever Q is attached; Z, the driving-pulley; a, guide-ribs, for keeping the feed-table in position; b, adjustable stops on the feed-table; c, oil-passages, for oiling the hollow shaft of the bit-heads; d, set-screws, for locking the hollow shaft so as to hold the bit-heads H in the position in which they are placed; e, bit-stocks provided with spur-wheels; f, spur-wheels on the shafts F for driving the bit-stocks e; g, set-screws, for holding the feed-table in any desired position.

In constructing this machine, I make it entirely of iron, and of various sizes, according to the work to be done, and it is obvious that as many additional bit-heads, with their gearing, as may be desired may be placed on one frame.

The frame A, and the legs or supports B, are made in any of the ordinary or suitable forms. The frames G, which carry the heads containing the bit-stocks I prefer to make tubular, with flat bases fitting the main frame, as shown; but their exterior may be made in any desired form. The heads are provided with a tubular section extending back through the frame G, as shown in Fig. 6. Through this tubular extension the shaft F passes, which is provided at its rear end with the gear-wheel E, and at its front end with a gear wheel or cogs, f, which engage with the cogs of the short bit-stocks e. These bit-stocks e and the shaft F are provided with suitable openings to receive and hold bits, augers, or other boring-tools. The journals of the short bit-stocks e are in the head H, which is cast hollow, or milled out, as shown at Fig. 6, and is provided with a face-plate, to give the outer bearings for the bit-stocks e, as shown at Fig. 6.

I have shown two of these additional bit-stocks e in each head H; but it is obvious that irregular boring can be done with one only, although I prefer the two additional ones, making three in all for each, as shown, and more than two can be put in; but no advantage of any account will be obtained thereby.

To the main frame A I attach arms or brack-

ets I, which are provided at their upper ends with a cylindrical portion, in which the shaft L' is placed. This shaft L' is provided with a female screw-thread, into which the screw-shaft runs, so that by turning the shaft N the feed-table will be raised or lowered, and when adjusted it can be secured in its adjustment by the lock-nut *g*. On the upper ends of the shafts L' arms O are attached, upon which the feed-table P is placed and operated. These arms are provided with a guide-rib, *a*, which fit into corresponding grooves on the under surface of the feed-table. To these arms O the hangers V are attached, and at their lower ends they are provided with suitable journals or bearings for the shaft U. The segment-wheels S T are attached to this shaft, and also the lever Q, by means of the collar Y, or other suitable connection. The main shaft C is provided with suitable bearings, and the gear-wheels D are adjusted on said shaft by means of set-screws, or a feather, or both. The gear-wheels D are arranged to operate from either end, as shown in Fig. 1. Whenever, in adjusting the boring-tools, the frames G are moved, a corresponding movement of the gear-wheels D is made, and one or the other of the gears thrown into connection, according to the direction in which the shafts are to be run.

Whenever it is desired to throw any one or more of the bit-heads out of gear, the wheels D are slipped on the shaft C, so as to leave the wheel E between both of the gears, so that with one double gear-wheel D, the shaft F can be run in either direction, or thrown entirely out of gear by a single adjustment.

In operation, power is communicated to the bit-stocks by means of the gear-wheels D E f,

and when it is desired to bore a straight row of holes, as, for instance, in horse-rake heads, the bit-heads H will all be turned down so as to bring the bits in a line, and at a uniform distance apart.

For irregular boring, the heads will be turned up or down, as desired, and locked in position by the lock-nut *d*.

It is obvious that any one or more of the bits can be taken out from the heads, so that each head will only bore one or two holes, as desired.

The arrangement for advancing or receding the feed-table enables me to operate it quicker, in either direction, than is done in other machines of a like character.

What I claim as new is as follows:

1. The main driving-shaft C, provided with the adjustable gear-wheels D, in combination with movable spindle-frames G, frames A, gears E, and heads H, all as and for the purpose specified.
2. The combination of the frame G, shaft F, and head H with one or more bit-stocks, *e*, substantially as described.
3. The combination of the brackets I, supporting-collars K, vertical screw-shaft, and shaft N, substantially as and for the purposes specified.
4. The combination of the arms O, hangers V, segments T S, racks R, and lever Q with the feed-bed P, substantially as and for the purposes specified.

CHRISTOPHER G. CROSS.

Witnesses:

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