2 Sheets—Sheet 1.

G. N. STEARNS.

HOLLOW AUGER.

No. 191,817. Patented June 12, 1877.

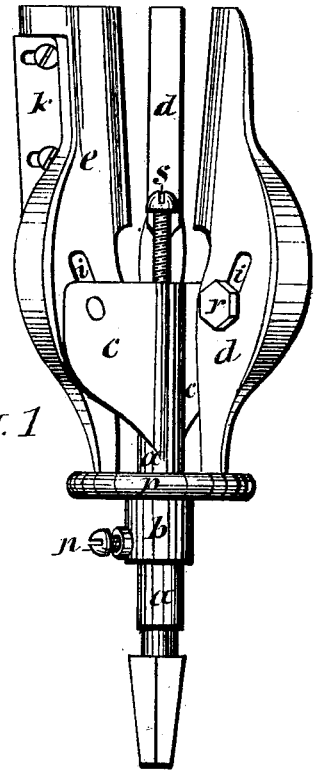

Fig. 1

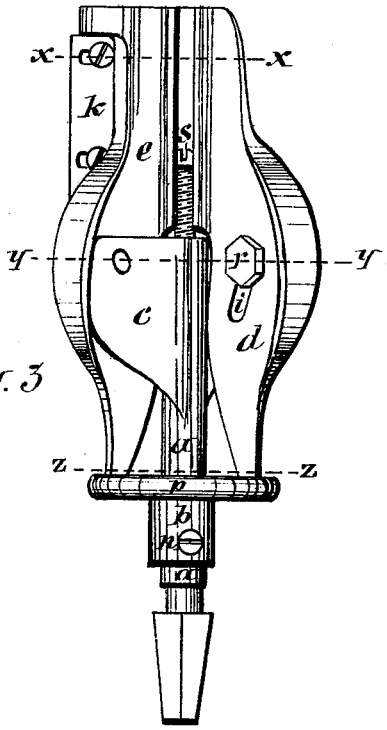

Fig. 3

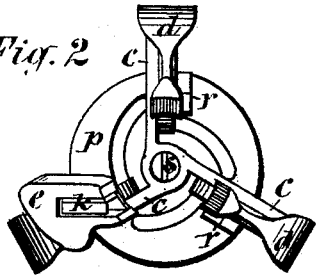

Fig. 2

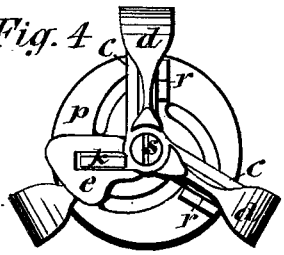

Fig. 4

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E. Laass
E. Bendixen

Inventor:
George N. Stearns,
by Pettit Hey, Atty.

2 Sheets—Sheet 2.

G. N. STEARNS.

HOLLOW AUGER.

No. 191,817.

Patented June 12, 1877.

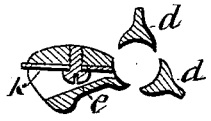

Fig. 6

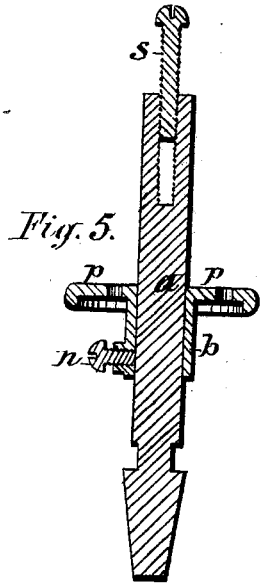

Fig. 5.

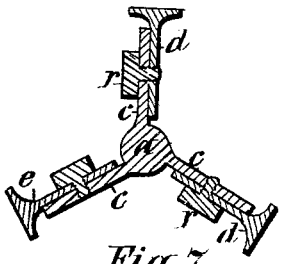

Fig. 7

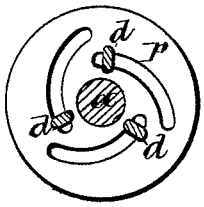

Fig. 8.

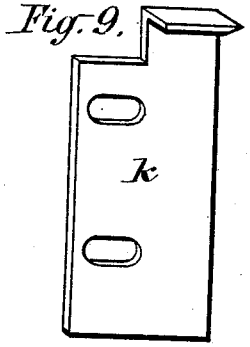

Fig. 9.

Witnesses:
E. Laass
E. Bendixen

Inventor:
George N. Stearns
by G. N. Hey
Atty.

UNITED STATES PATENT OFFICE.

GEORGE N. STEARNS, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN HOLLOW AUGERS.

Specification forming part of Letters Patent No. **191,817**, dated June 12, 1877; application filed October 26, 1876.

To all whom it may concern:

Be it known that I, GEORGE N. STEARNS, of the city of Syracuse, in the county of Onondaga, State of New York, have invented a certain new and useful Improvement in Hollow Augers, of which the following is a specification:

This tool, although of the nature of a hollow auger, is an entirely new and novel device for this purpose, and is so constructed as to be readily adjusted, by an ingenious arrangement and combination of movements, to cut tapering tenons of different sizes—a result, I believe, that has never before been accomplished by tools of this description.

Tenons, such as are used upon the outer ends of wagon-spokes and similar articles, can also be cut with this tool. Hence, I denominate it an auger for cutting straight and tapering tenons; and I do hereby declare the following to be such a clear and exact description as will enable any person skilled in the art to which it pertains to construct the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked therein, like letters indicating corresponding parts in the different figures.

This invention is designed, by its adjustability, to combine in itself a separate auger for each sized tenon, either straight or tapering, and of any diameter and length within its scope. It also allows for the perceptible variance in the diameter of boring-bits, which experience has demonstrated to be indispensable to the utility of such a tool. But it is more expressly designed for cutting tapering tenons, such as are used on shaft, pole, whiffletree-tips, &c., for receiving a ferrule. In order to provide an effective device, which would conform the taper of the tenon to various standards of the ferrules in use, I found that it was necessary to make the auger with three distinct adjustments.

The first has reference to the smaller sizes and gradual tapers, and is made by operating the adjusting-jaws (hereinafter described) with the hand-wheel having cam-slots in its upper face, as shown in the drawings, or by a cone-shaped nut provided with a thread.

The second adjustment forms a device for cutting larger tenons and more decided tapers, and is accomplished by moving the hand-wheel up on the round part of the stock. The lower ends of the jaws pass through the cam-slots in the hand-wheel, which has a hub or sleeve fitting on the rounded stock, so as to move up or down, and may be secured at any point by a screw. The jaws are provided with slanting slots, which may be in the wings of the stock, and through which pass bolts forming pivots. This arrangement of the traveling sleeve and the slanting slots allows this movement, while the set or securing screw makes the adjustment operative on the graduated tapers by securing the hand-wheel and collar at any desired point on the stock, where the first adjustment can be further utilized for varying the size as desired.

The third adjustment relates to determining the length of the tenons, and is accomplished by inserting a screw of sufficient length in the top of the stock. This screw also regulates the size of the taper—as, for example, if the auger is set for a certain-sized taper, by diminishing the length of screw, the shaft, or on whatever the tenon is being cut, enters farther into the auger, thus changing the size of the taper proportionately as the screw is shortened.

The knife is also adjustable, in order to conform to the various changes of the different adjustments above described.

The whole device is made of metal—preferably of steel and wrought-iron—and is constructed and arranged in all its parts so as to be compact, strong, and durable.

In the drawings, Figures 1 and 3 are side views of my newly-invented auger for cutting straight and tapering tenons. (Fig. 1 shows the working of the second adjustment, the hand-wheel *p* being moved up on the stock. Fig. 3 shows the hand-wheel and collar as used in the first adjustment.) Figs. 2 and 4 are end views of 1 and 3 respectively. Fig. 5 is a central longitudinal section. Fig. 6 is a transverse section on line *x x* in Fig. 3. Fig. 7 is a transverse section on line *y y*; Fig. 8, on *z z*. Fig. 9 is an enlarged view of the knife detached.

The metal stock is shown at *a*, and is provided on the upper part with the rudder-

shaped wings *c c c*, diverging from a common center, forming bearings on which the cutter-carrying jaw *e* and the guide jaws *d d* are pivoted. The lower part of the stock is provided with a shank, which, when the tool is used in an ordinary bit-brace, is left square; but may be round, or of any other suitable shape, when used in a lathe or other machine. The part of the stock between the shank and wings, as shown in the drawings, is round, and fitted to receive the traveling or movable sleeve *b*, provided with a screw, *n*, for holding it at any point of adjustment. This sleeve *b* is attached to the hand-wheel *p*, having cam-slots, through which the lower ends of the adjusting-jaws pass. I can, however, accomplish the same result by turning a thread on the round part of the stock, and using in place of the traveling-sleeve and hand-wheel a cone-shaped nut of sufficient taper to open and close the adjusting-jaws. The cutter-carrying jaw *e* and the guide-jaws *d d* are pivoted on the wings of the stock and secured by the bolt or screw *r*. The jaws are provided with slanting slots *i i i*, through which the pivoting bolts or screws pass. The slanting slots may be in the wings of the stock instead of the jaw. In the latter case the pivoting-bolt or screw would play in the wing, and secure the jaw, instead of the manner shown in the drawings.

I ordinarily employ three jaws—the cutter-carrying jaw *e* and the guide-jaws *d d*—but am not limited to that number to produce the desired results. The cutter-carrying jaw *e* has upon its side an elongated wedge-shaped mortise-box, with the opening extending up into the top of the jaw. The knife or cutter is set in this mortise-box, and is confined by screws passing through slots in the knife or cutter. The interior faces of the cutter-carrying jaw and guide-jaws are shaped so as to form segments of a circle, as shown by the transverse section, Fig. 6, second sheet. The exterior of the jaws is finished off as taste may dictate, the lower ends tapering so as to pass through the cam-slots, Fig. 8, second sheet, in the hand-wheel *p*, before described. The cam-slots in the hand-wheel are concentric, working from right to left in such a manner as to draw down the lower ends of the jaws, allowed by the pivots, causing the parts of the jaws above the pivots to spread or open as the hand-wheel is turned. The cam-slots and screw *n* hold it in position, thus producing an adjustment comprehending several sizes. If it is desired to make a larger tenon, or to alter the taper to a more conical shape in the large sizes, it is simply necessary to use the second adjustment, before described as consisting of the device of the traveling sleeve and the slanting slots in the jaws, as shown in Figs. 1 and 3, which, when moved up, permit a wider spreading of the jaws, and by employing the cam-slots in the hand-wheel the taper can be graduated as required. To regulate the length of tenon, I provide the screw *s*, which performs its office by being lengthened for a short tenon, and shortened if a longer tenon is required. This screw *s* also changes the size of the taper by allowing the article on which a tenon is being cut to enter farther into the auger—a desirable feature in cutting small and tapering tenons. The cutter or knife *k* (shown by the enlarged detached view, Fig. 9) is shaped to conform to the opening in the cutter-carrying jaw *e*, before described. It has, at the upper end, a chisel-shaped lip, setting at right angles to the upright cutting-edge, and projecting in, when the knife is confined in position for use. The office of this portion of the cutter or knife is to cut a shoulder on the tenon, which is accomplished by setting the auger to a size smaller than the article on which the tenon is to be cut, or, in other words, so as to leave enough timber for a shoulder. The projecting lip of the knife is also used when the auger is employed for cutting straight tenons, which requires the use of the adjustments before described. The scope of the auger is, therefore, limited on straight work to intermediate-sized tenons, say, from one-half to one inch, while on tapered work all sizes from three-fourths ($\frac{3}{4}$) to one and one-fourth ($1\frac{1}{4}$) inches can be formed.

In brief, the results mentioned in the foregoing specification are obtained by the different movements combined with the adjusting and cutter-carrying jaws, as described, and as shown in the drawings.

Having thus fully described my invention for cutting tenons, I claim, and desire to secure by Letters Patent—

1. The adjusting-jaws *d d*, cutter-carrying jaw *e* provided with the slots *i i i*, in combination with each other, and the stock *a* provided with the wings *c c c* and the screw *s*, substantially as herein set forth and described.

2. The hand-wheel *p* with cam-slots having sleeves *b*, held on a stock by screw *n*, in combination with the slotted adjusting-jaws herein described, substantially as and for the purposes specified.

GEO. N. STEARNS.

Witnesses:
JOHN Y. TERRY,
SCHUYLER W. TERRY.