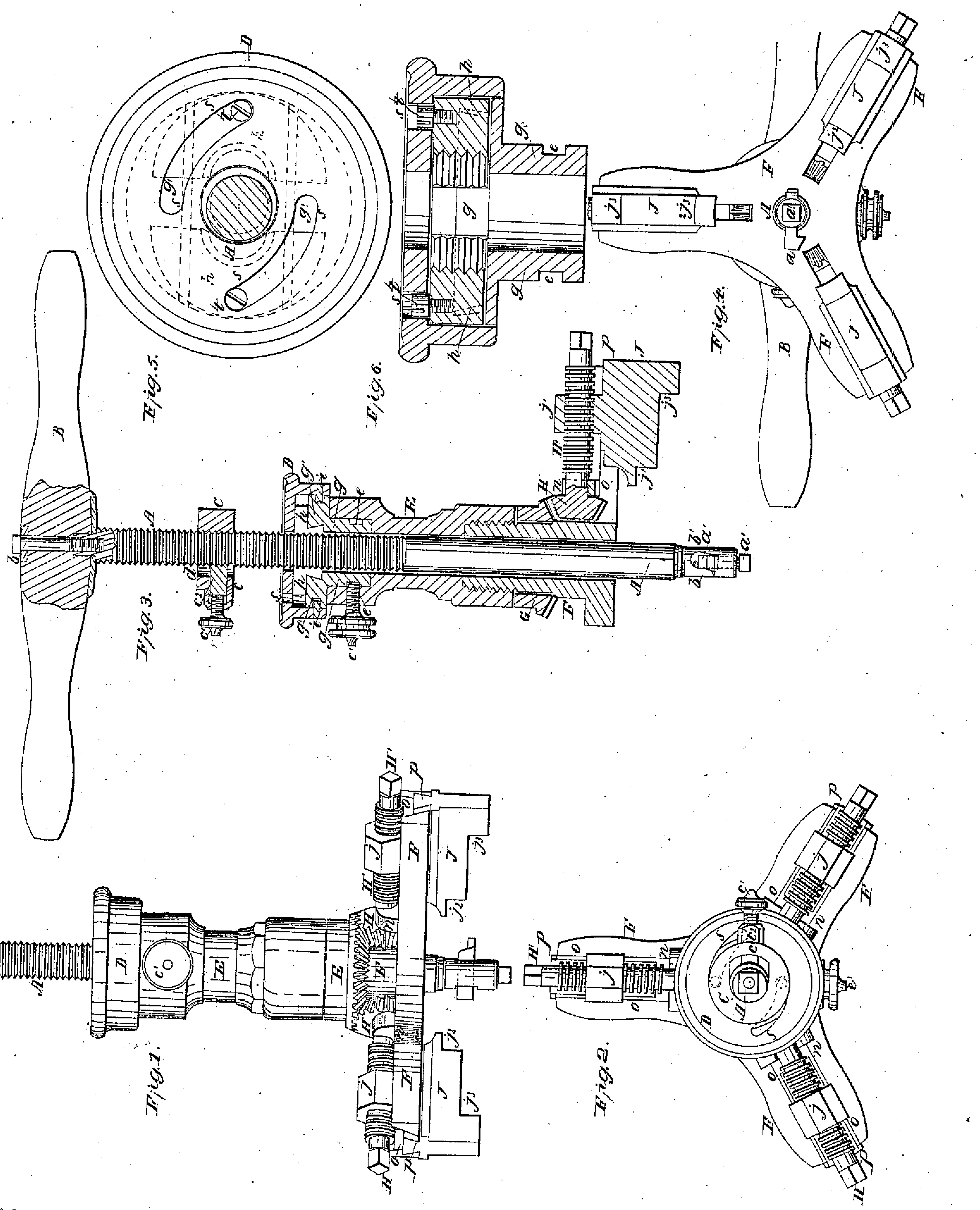
A. R. Silver,

Boring Hubs,

No. 80,837, Patented Aug. 11, 1868.



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A. R. SILVER, OF SALEM, OHIO, ASSIGNOR TO HIMSELF AND JOHN DEMING, OF SAME PLACE.

Letters Patent No. 80,837, *dated August* 11, 1868; *antedated July* 25, 1868.

IMPROVEMENT IN HUB-BORING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, A. R. SILVER, of Salem, in the county of Columbiana, and State of Ohio, have invented a new and improved Hub-Boring Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of one side of the machine, with the upper portion of the mandrel broken away.

Figure 2 is a top view of the machine, with the handle of the mandrel removed.

Figure 3 is a diametrical section through the machine.

Figure 4 is a bottom view.

Figures 5 and 6 are enlarged views, showing the construction of the expansible feed-nut and its box.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements on machines which are designed for boring hubs true, and producing well-defined shoulders in them for receiving axle-boxes.

The invention provides a self-centring chuck, having adjustable jaws, all of which are adapted for being adjusted simultaneously toward and from a common centre, for the purpose of rigidly griping and holding a hub in proper position, with respect to the axis of the mandrel carrying the boring-bit, for being bored and shouldered, as will be hereafter explained.

The invention further provides for readily withdrawing the mandrel, which carries the boring-tool, from the hubs after the operations of boring and shouldering have been completed; also, for preventing a progressive movement of the mandrel during the formation of the shoulders in the hubs, by the employment of an expansible feed-nut, which is made in two sections, and fitted to slide in dovetail ways formed in a cylindrical box, arranged upon the upper end of the tool-stock, said box being applied to the tool-stock, so that it can be fixed while a hub is being bored, and allowed to turn with the mandrel during the act of forming a shoulder in the hub, as will be hereinafter explained.

The invention further provides an adjustable gauge, which is adapted for being secured fast to the screw-cut portion of the mandrel, at any desired point thereon, according to the depth which it is desired to bore into a hub; said gauge being so constructed, with a thread on one side, and an adjuatable gib on the opposite side, that the gauge can be adjusted upon its mandrel without turning or screwing, as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings, F represents the chuck-frame, which consists of three radiating arms, which are arranged at equal distances apart around a hollow screw-cut stem, F′, and constructed with radial slots, *o o o*, in them, as shown in figs. 2, 3, and 4.

The slot *o* of each arm has its sides bevelled and adapted for receiving a dovetail slide, *p*, which is constructed upon a griping-jaw, J, so that this jaw can be moved toward and from the axis of the chuck. Each jaw J is constructed with serrated clamping-shoulders, j^2 j^3, upon its lower side, and also with an elevation, j^1, upon its upper side, which elevation projects above the upper surface of each chuck-arm, and is screw-tapped for receiving through it an adjusting-screw, H′, carrying on its inner end a small bevel-spur wheel, H, and having its outer end squared for receiving a wrench. The inner portion of each one of the screws H has its bearings in a stirrup, *n*, which keeps each screw steady and in place.

Rising from the centre of the chuck-frame F is a cylindrical hollow stem, F′, around the lower portion of which is placed loosely a bevel-spur wheel, G, the teeth of which engage with the three pinion-wheels H. This spur-wheel G is designed for causing the three griping-jaws J J J to move simultaneously, and preserve their concentric positions while being adjusted. Thus it will be seen that, by applying a wrench to one of the screws H, and turning it, the other two screws will also be turned in like manner.

That portion of the hollow stem F′ which projects above the collar of the spur-wheel G, has a screw-thread cut upon it, and receives a hollow stock, E, in the upper end of which an annular chamber is formed for the reception of the cylindrical neck of a box, D. When the stock E is screwed down tightly, it prevents the spur-wheel G from rising and becoming disengaged from the teeth of the pinions H′.

The circular box D is applied to a circular bed-piece, *g′*, having a dovetail groove made diametrically across its upper surface, into which groove dovetail tenons, which are formed upon two half nuts, *h h*, are fitted to slide, as shown in figs. 3, 5, and 6.

The half nuts are arranged on each side of the axis of the box or mandrel A, and are moved by means of studs, *t t*, which project from the upper sides of these nut-sections and enter segmental slots, *s s*, which are made through the top plate or cap of the box D, eccentrically to its axis, as shown in figs. 3, 5, and 6.

The grooved bed-plate *g′* is fitted into the lower end of the cap D, so as to allow this cap to turn freely, and said plate *g′* is attached to said cap by means of pins, *i i*, entering grooves in the periphery of plate *g′*, as shown in fig. 3.

When the cylindrical neck *g* is introduced into the upper chambered end of the tubular stock E, and confined rigidly in place to this stock, by the set-screw *e′*, the point of which enters an annular groove made in said cylindrical portion *g*, as shown in fig. 3, and the

cap D is turned in one direction, the half nuts *h h* will be caused to approach the axis of the mandrel A, and engage with the screw-thread which is upon this mandrel, and when the cap D is turned in an opposite direction, the half nuts *h h* will be separated and disengaged from the thread on the mandrel.

The annular groove *e*, in the cylindrical neck *g*, will allow this neck to be loosened, so that it will turn without allowing it to be withdrawn from the stock E.

The mandrel A, which passes through the several parts, as shown in fig. 3, is provided with a T-handle, B, upon its upper end, secured to it by a screw, *b*, between which handle and the cap D of the feed-nut is a gauge, C, which consists of a circular plate, having an oblong hole, *d*, through it, and a chambered projection, c^2, on its periphery.

On one side of the opening *d* threads are cut, adapted for receiving the screw-threaded portion of the mandrel, and diametrically opposite the threads, on the gauge-plate, a gib, *c*, is fitted into the chambered portion C^2, so as to slide freely. On the inner end of the gib *c* is a thread to correspond with that on the mandrel, and at the opposite or outer end of the gib a set-screw, *c'*, is applied, which, being tightened, will securely clamp the gauge to the mandrel, so as to prevent the gauge from slipping up or down, or turning around the mandrel.

When the position of the gauge-plate C is to be changed, the set-screw *c'* is turned so as to loosen it, and the side of the gauge-plate, through which the said screw passes, is pressed against the mandrel, thus forcing the movable gib back into its chamber, and releasing the gauge-plate, when it is free to slide up or down on the mandrel.

The lower extremity of the mandrel A has a mortise made diametrically through it, through which the bit *a* passes, and in which this bit is secured by a set-screw, *a'*, that is tapped into the end of the mandrel, as shown in fig. 3.

That portion of the lower end of the mandrel A, which I have lettered *b*, is smaller in diameter than the upper portion of the mandrel, and is made so as to allow the free escape of chips, while boring, to prevent choking, and also to allow a smaller hole to be bored than could be made if the mandrel were of the same diameter throughout its length.

I make a concave depression, *b'*, in the reduced portion *b* of the mandrel A, just behind the cutter or bit, so as to form a space of sufficient capacity to receive the chips as fast as they are produced, and allow them to escape freely from the cutting-edge of the bit when a very small hole is to be bored.

When a hub is to be bored, the gauge-plate C is secured on the mandrel at the proper distance from the cap D of the feed-nut to bore the required depth of hole in the hub. The hub being secured between the three jaws J, as above described, the mandrel is turned with a progressive or feeding-movement, until the gauge-plate C comes in contact with the cap D; the set-screw *e'* is then loosened, permitting the feed-nut and its bore or cap to turn with the mandrel. The feed being thus stopped, a few turns of the mandrel form a perfectly square shoulder. The shoulder being finished, the cap D is turned to the left, thereby separating the two sections of the feed-nut, and releasing the mandrel, when it can be withdrawn from the hub instantly, and again secured in the nut by turning the cap toward the right hand.

Having described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the radially-grooved chuck-plate, sliding griping-jaws J, adjusting screws H', pinions H, and centre spur-wheel G, substantially in the manner and for the purpose described.

2. The sections *h h* of the feed-nut, fitted in slotted bed *g'*, applied to a turning-box or cap D, and constructed with a neck, *g*, substantially as described.

3. The combination of the expansible nut *h*, bed *g'*, neck *e*, set-screw *e'*, and stock E, substantially as described.

4. The construction of the gauge-plate C, with an oblong opening, *d*, through it, one side of which is screw-cut to fit the mandrel, and the other side is provided with an adjustable screw-cut gib, C, and a set-screw, *c'*, substantially in the manner and for the purposes described.

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Witnesses:
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