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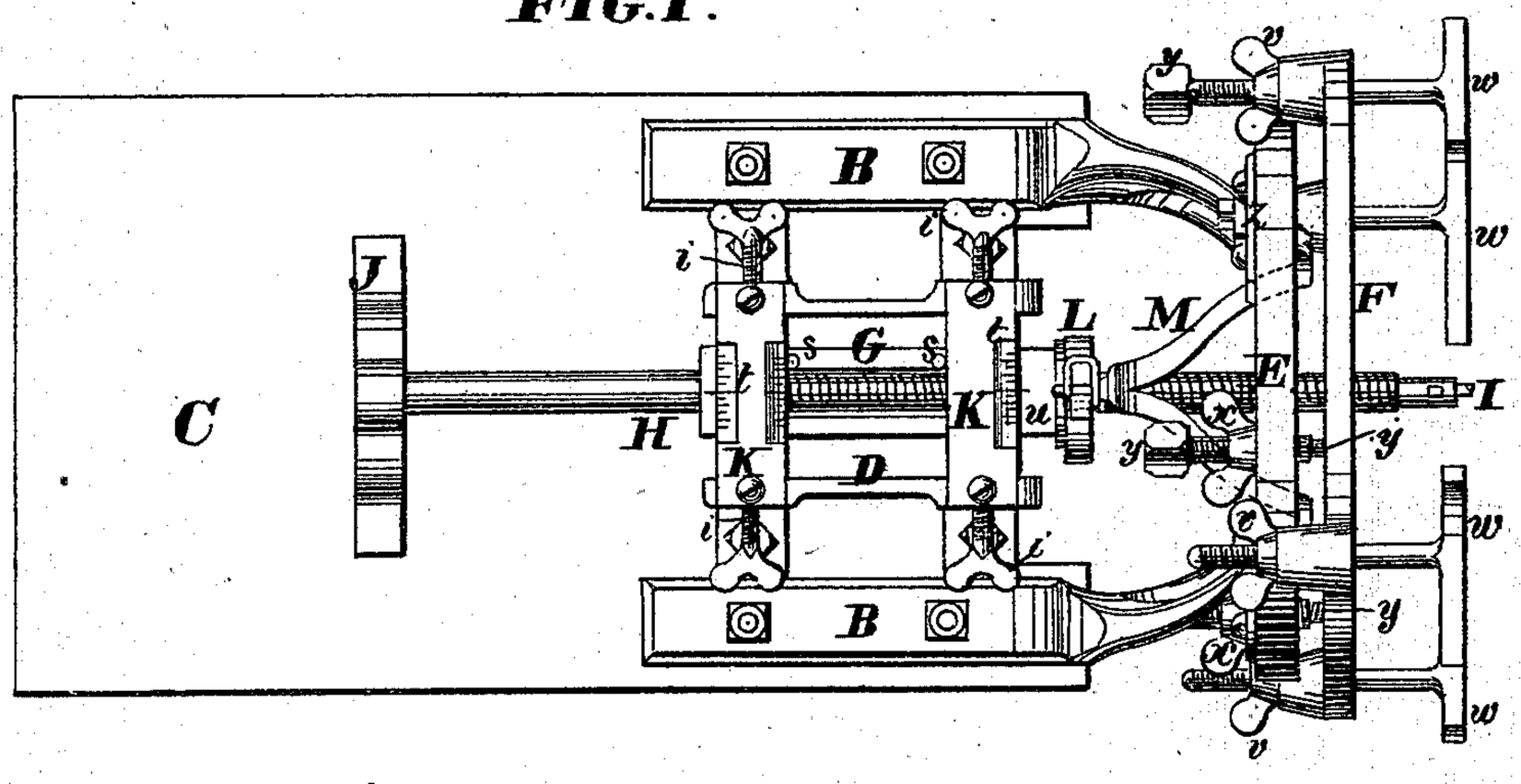
A. O. ABBOTT.

Hub-Borers.

No. 146,420. Patented Jan. 13, 1874.

FIG. 1.



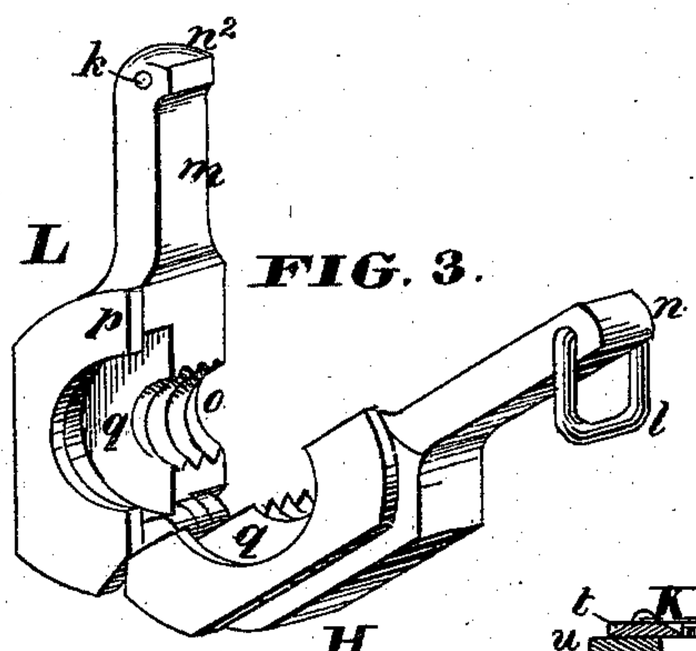


FIG. 3.

FIG. 2.

FIG. 4.

WITNESSES:

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FIG. 5.

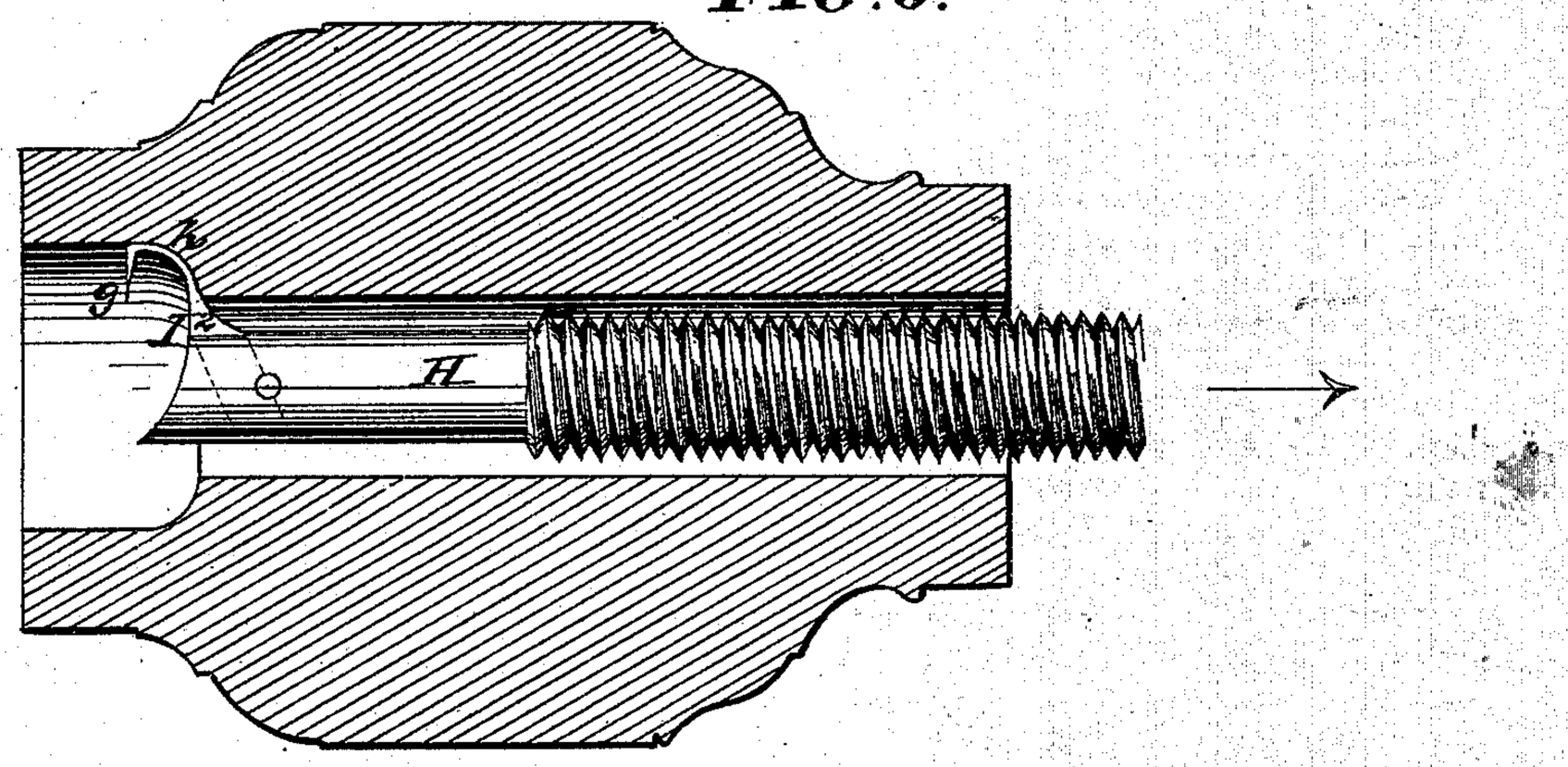
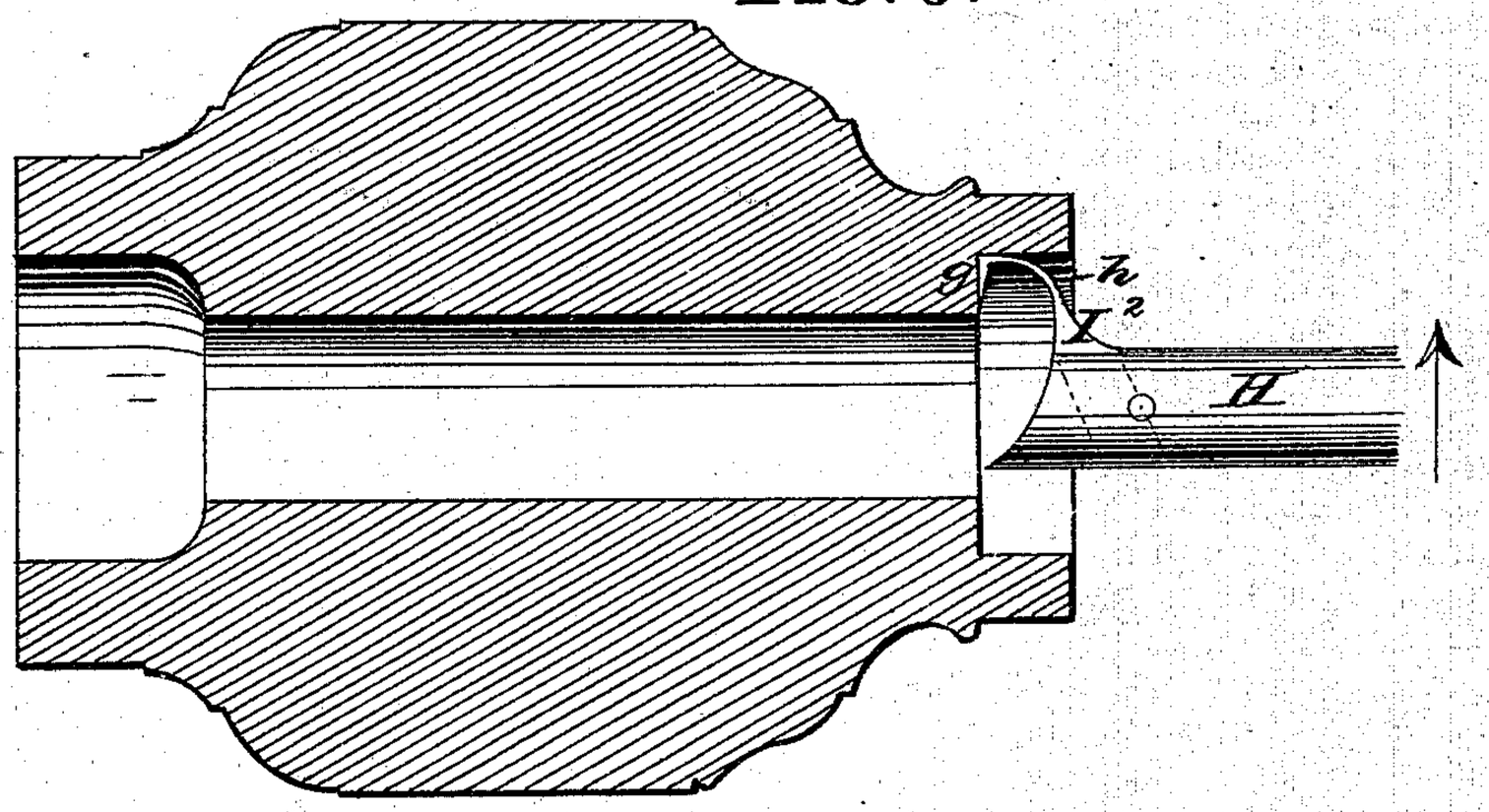


FIG. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ADRIAN O. ABBOTT, OF ADRIAN, MICHIGAN.

IMPROVEMENT IN HUB-BORERS.

Specification forming part of Letters Patent No. **146,420**, dated January 13, 1874; application filed November 1, 1873.

To all whom it may concern:

Be it known that I, ADRIAN O. ABBOTT, of Adrian, in the county of Lenawee and State of Michigan, have invented an Improved Hub-Borer, of which the following is a specification:

The subject-matter of this invention is a machine for wagon-makers to set boxes with; or, as such machines are termed, a hub-borer of improved construction. It is of that class of hub-borers in which the wheel revolves and a non-rotary cutter is supported and fed by a central shaft. It is also of that sub-class in which the cutter-shaft is adjusted to produce either a cylindrical bore or one more or less tapering, as required.

The present invention consists, first, in a peculiar feeding-nut sustaining the same effective position relatively to the adjustable guides of the cutter-shaft at all times, and connected by peculiar means to the revolving rings so as to work freely therewith, all the effects of the irregular motion incident to taper-boring being confined to this connection; secondly, in the combination of a foundation-ring mounted on the fixed bearing of the machine; a face-ring furnished with gripes for attaching the wheel; and three equidistant right and left adjusting-screws, furnished with jam-nuts and applied between these rings, as improved means for truing the wheel.

Figure 1 is a plan view of a hub-borer illustrating this invention. Fig. 2 is a vertical longitudinal section of the same in a central plane, a wheel, as applied to the machine, being represented in dotted lines. Fig. 3 is a perspective view, on a larger scale, of the feeding-nut, detached. Fig. 4 is a like view of a peculiar cutter. Figs. 5 and 6 are elevations of the said cutter and a portion of the cutter-shaft with longitudinal sections of a hub illustrating the operation of cutting enlargements in the ends of a hub by means of the improved cutter.

The stationary parts of this machine consist of an annular bearing, A, attached, by a pair of forked stays, B, to a horizontal base, C, and a bracket, D, arranged in line with the axis of this bearing behind the same on the same base. These parts are securely united by bolts. The annular bearing A is of sufficient diameter to receive the largest hubs within it with a margin; but in length or depth it is very narrow, so as at all times to come within the wood of the hub. Mounted on this bearing is a "foundation-ring," E, recessed to embrace the periphery and the face of the same, and retained by clip-plates *z* applied to its back. To the foundation-ring E a second ring or annular face-plate, F, is attached by three equidistant right-and-left adjusting-screws, *y*, furnished with jam-nuts *x*. This face-ring F is provided with fastening-bolts or "gripes" *w*, having clamping-nuts *v*, the same being applied to perforated bosses on the face-ring, and constructed with long T-heads to engage with the spokes of wheels, which are thus attached to the revolving rings and adapted to be centered and trued relatively to the cutter, as hereinafter set forth. A rectangular longitudinal recess in the top of the bracket D receives a square slide, G, the ends of which constitute guide-boxes *u* for a long shaft or bar, H, the front end of which is screw-threaded, as represented, and furnished with a diagonal socket and a transverse key to receive and secure a cutter, I, of proper shape. In the illustration this cutter-shaft is cylindrical throughout to facilitate its manufacture, and is prevented from turning by a cross-bar, J, applied to its rear end, and sliding on the base C. The front end of the cutter-shaft is beveled to form an extension of the throat of the cutter. The guide-box G is prevented from vertical displacement in its bracket D by cross-bars K, and these are furnished with graduated beveled edges *t*, to constitute indexes or scales by which to center and adjust the cutter-shaft. The guide-box is prevented from longitudinal displacement in its bracket by pins *s* engaging with the inner edges of the cross-bars K. For feeding the cutter-shaft H a peculiar nut, L, is provided. For the reception of this feeding-nut a grooved cylindrical neck, *r*, is formed on the front end of the guide-box G, concentric with the cutter-shaft; and for revolving the nut a properly bent and braced arm, M, is attached to the revolving ring E, so as to project rearwardly through the annular bearing A. The feeding-nut L is shown in detail in Fig. 3. It is constructed with a cylindrical cavity, *q*, and a terminal internal flange, *p*, at one end, to embrace the grooved bearing-neck *r*, and with an internal screw, *o*, to engage with the threaded front end of the cutter-shaft. It

is further constructed with a pair of arms, *n* n^2, between which a radially-extended slot, *m*, is formed parallel to the axis of the nut, to receive the terminal finger *m'* of the revolving arm M. To render the feeding-nut detachable, it is constructed in two longitudinal parts united by a hinge which is arranged opposite the arms *n* n^2, so that the latter may project from the respective open edges. A link, *l*, is attached to one of the arms, *n*, for uniting the pair to hold the nut closed, and a locking-pin may be applied in a hole, *k*, to secure the same. To adjust the cutter-shaft H laterally, as required, thumb-screws *i* are applied to the sides of the guide-box G at each end through threaded perforations, constituting stationary nuts, in the sides of the bracket D. The cutter I, for ordinary work, is of a common form. For forming bore-enlargements in the ends of the hub, a peculiar cutter, I^2, is constructed, as illustrated in Fig. 4, with a main blade, *h*, curving forwardly to or slightly beyond its most prominent point, and there provided with an inwardly-projecting lip or supplemental blade, *g*, parallel, or nearly parallel, when in position, to a plane at right angles to the axis of the cutter-shaft. The main blade *h* produces the cylindrical surfaces and a round shoulder, and the supplemental blade *g* produces a square shoulder, as illustrated in Figs. 5 and 6, and hereinafter more fully set forth.

In operating this machine the cutter-shaft is first centered, then the wheel is attached, then the hub is centered, then the wheel is trued, then the hole is cut.

To center the shaft, the thumb-screws *i* at the ends of the guide-box G are turned until center marks on the box are even with the center marks on the scales *t*.

To put the wheel on, the cutter-shaft or spindle H is introduced into the center hole of the hub, putting the face of the wheel toward the machine, and the wheel is loosely attached by the gripes *w*, which are adjusted so as to be in about the same plane or nearly level with each other.

To center the hub, (by the outside,) let the operator take one of the gripes *w* in his hand, holding the spoke beneath firmly against it; see that the hub appears to be in the center, and then tighten the gripe; then measure the distance between the hub and the stationary bearing A, and, turning the wheel one-half of a revolution, measure again; add one-half of the difference to the smaller measure, and this will give the distance each part of the hub should be from the bearing in passing any given point; then turn the wheel back to the first position, and put the hub at the correct distance at that point; then fasten the gripe; then turn the wheel one-fourth of a revolution, and set the hub at the proper distance here by moving the spokes beneath the gripe which has not yet been tightened; then fasten this gripe and the others, and the wheel is centered by its outside.

To center by the hole in the hub, place the gripes level with each other; fasten one of the gripes *w* with the cutter-bar H in the center of the hub, sighting it from above; then turn the wheel one-fourth of a revolution, and center in that position; and then fasten all the gripes. This is the preferred method of centering the hub.

Owing to the peculiar form and arrangement of the fixed bearing A on which the wheel revolves, a portion of the hub is exposed behind the same, by observing which the wheel may be quickly centered. The necessity for special centering devices is thus obviated, and the use of any ordinary scale or pocket-rule for this purpose is permitted. This construction materially reduces the cost of the machine.

To true the wheel, adjust the face plate or ring F by means of the three screws *y* until the rim of the wheel runs true.

To bore the hub when a cylindrical bore is desired, turn the wheel with the revolving rings E F to the left until the operation is completed, a cutter of the proper length being used. The rings transmit the motion by the arm M *m'* to the feeding-nut L *m*, and the cutter-shaft is thus fed forward. The cutting of a cylindrical bore is illustrated in Fig. 2. When the cut is finished the feeding-nut may be opened and removed, and the shaft quickly slid back.

If a tapering bore is desired, the guide-box G is set at the proper angle by means of the adjusting-screws *i* and scales *t*, and the operation proceeds as in cutting a cylindrical bore.

To cut a suitable bore-enlargement in the back of the hub to receive the flanged inner end of the box, as illustrated in Fig. 5, the cutter I^2 is substituted for the ordinary cutter, I, when the latter has passed through the hub. The cutter-shaft is then adjusted laterally by means of the screws *i* for a cut of the proper diameter, and the cutter is fed inward by turning the wheel to the right. The operation is concluded when an enlargement of the required depth has been produced. The feeding-nut is then detached and the cutter forced back and removed. The cutter-shaft may then be drawn inward preparatory to the next operation. The enlargement thus produced has a round shoulder, or one of the shape of the main blade *h* of the cutter, which blade alone acts in this operation, or in any other where the cutter-shaft is fed longitudinally. The round shoulder answers perfectly well for this enlargement, and is cut with much less power than a square shoulder.

To cut a bore-enlargement with a square shoulder in the front of the hub to receive the attaching-nut, as illustrated in Fig. 6, the cutter I^2 is applied to the cutter-shaft when the latter has been retracted, and, with the feed-nut L, detached. The wheel is then turned to the right, and the cutter-shaft is fed laterally by means of the screws *i* until the required diameter of enlargement has been produced. In this operation the supplemental

blade *g* of the cutter severs the chips and forms a square or nearly square shoulder, as required.

The straight or tapering bore, with an enlargement of proper shape at each end, is thus produced without disturbing the adjusted wheel, and with economy of power and strain, and by a simple operation.

The following is claimed as new:

1. The feeding-nut L, constructed with the swivel-socket and flange *q p*, in combination with the guide-box G, having the cylindrical grooved neck *r* to receive the same, as described, for the purpose specified.

2. The arm M *m'* and radial slot *m*, in combination with the swiveled feeding-nut L, as means for revolving the same, as set forth.

3. The combination of the foundation-ring E, the face-ring F, carrying the attaching-gripes *w v*, and the three equidistant right and left adjusting-screws *y*, with their nuts *x*, for truing the wheel in the manner set forth.

ADRIAN O. ABBOTT.

Witnesses:
CHAS. T. KING,
FRED BARSE.