E. CASWELL.

HUB-BORERS.

No. 194,290. Patented Aug. 21, 1877.

Fig. 1.

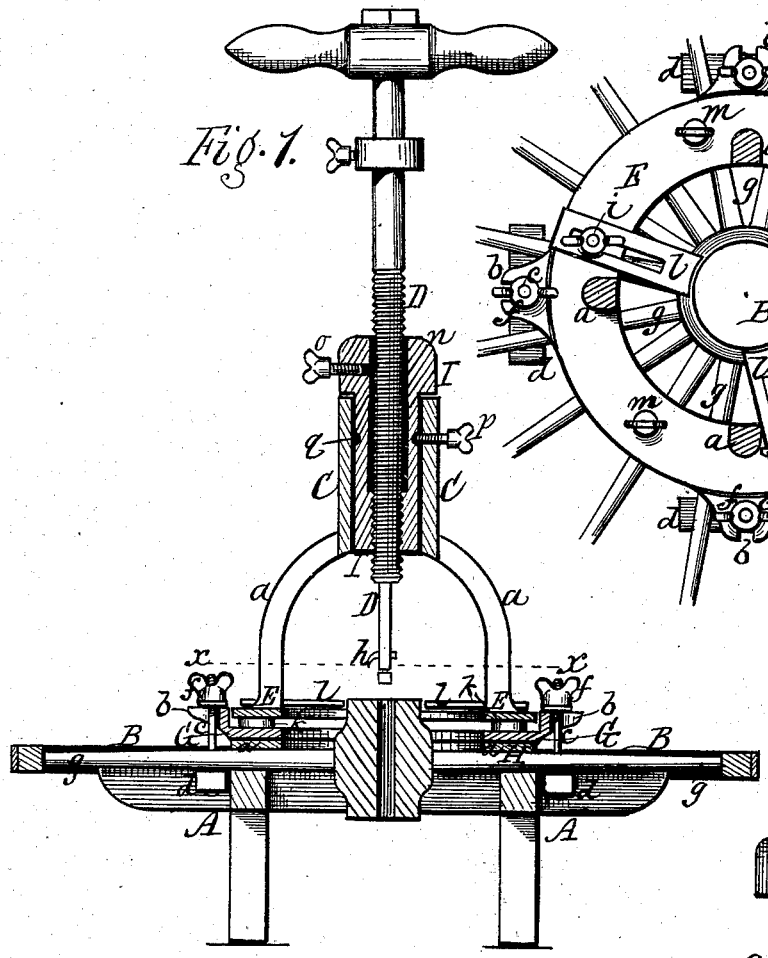


Fig. 2.

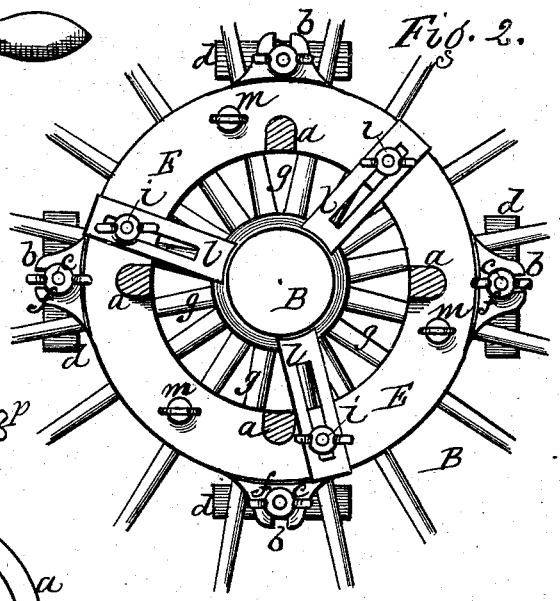


Fig. 3.

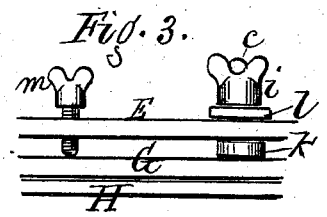


Fig. 4.

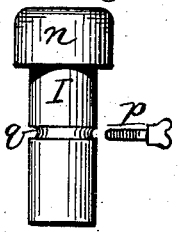
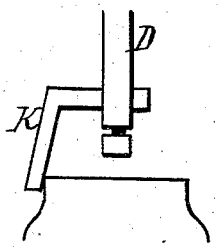


Fig. 5.



Witnesses.
Edwin Scott
Jacob Spahn

Inventor.
Ezra Caswell.
per R. F. Osgood, Atty.

UNITED STATES PATENT OFFICE.

EZRA CASWELL, OF LYONS, NEW YORK.

IMPROVEMENT IN HUB-BORERS.

Specification forming part of Letters Patent No. **194,290**, dated August 21, 1877; application filed December 11, 1876.

To all whom it may concern:

Be it known that I, EZRA CASWELL, of Lyons, in the county of Wayne and State of New York, have invented a certain new and useful Improvement in Hub-Borers; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation. Fig. 2 is a cross-section in line *x x* of Fig. 1, showing the apparatus attached to a wheel. Figs. 3, 4, and 5 are detail views.

My improvement relates to an apparatus for boring hubs, in which the machine is clamped to the wheel, and the cutter is turned by hand.

The invention consists in the construction and arrangement of parts hereinafter more fully described and definitely claimed.

A represents the frame or bench upon which the wheel is mounted. B is the wheel. C is a socket, through which passes the screw-shaft D. This socket is connected by curved arms *a a* with a ring, E. G is a ring similar to E, located below the same, and H is a packing-ring, of leather or other soft material, which fits the bottom of ring G. The opening in these rings is large enough to receive hubs of all sizes.

The lower ring G has slotted lugs *b b*, which project upward and embrace the upper ring E, thereby keeping the two centered and in proper position. Through the slots of these lugs pass bolts *c c*, having blocks *d d* at the bottom and nuts *f f* at the top. The blocks *d d* rest below the spokes *g g* of the wheel, while the bolts *c c* pass between the spokes. By this means the ring G is clamped fast on top of the wheel, and the packing-ring H, resting between said ring and the spokes, prevents any bruising of the latter. The wheel is then laid on top of the bench A, and the screw-shaft D is turned, which feeds the cutter *h* through the hub, as usual.

The upper ring E is attached to the ring G by bolts and nuts *i i*, the bolts passing through rubber packings *k k*, which are interposed between said rings, and serve to keep them some distance apart, as shown most clearly in Fig. 3. The same bolts and nuts also secure the slotted gages *l l* on top of the ring E.

When the apparatus is properly adjusted and centered upon the wheel, these gages are moved in, like a chuck, to bear against the end of the hub, thereby keeping it in place, as shown in Fig. 2. They prevent the displacement that might occur under strain.

m m are adjusting-screws, which pass through the upper ring E at intervals, and bear upon the lower ring G. If desired, they may lie in the same radial line with the bolts *i i*, and pass through the slots of the gages *l l*. They are intended to act in conjunction with the bolts *i i* and packings *k k* in producing proper adjustment of the machine, to plumb the cutter to the hub. This is done by turning up one set and letting out the other set of bolts or screws, the packings taking up the slack. By this means a very accurate adjustment may be attained, and there will be no looseness between the rings E G, the packings always holding them tight. These packings are essential in such a construction of the apparatus.

I is a circular bearing or nut, which rests and turns loosely in the socket C. The lower end is threaded internally, to receive the screw-shaft D. The bearing or nut has a shoulder or head, *n*, at the top, which bears on top the socket C, and prevents the nut from falling through.

o is a set-screw, which passes through the the head *n*, and bears against the screw-shaft D. *p* is a corresponding set-screw, which passes through the socket C, and bears against the nut I. The latter has a circumferential groove, *q*, in line with the set-screw, into which said screw strikes.

In the act of boring, the screw *p* is set up against the nut I, to hold the same stationary, and the screw *o* is loosened, as shown in Fig. 1. This allows the screw-shaft to feed down through the nut or bearing as it is revolved. But when the screw *o* is set up against the screw-shaft, and the screw *p* is loosened, it will be seen that the screw-shaft and nut will turn together as one fixture, and the screw-shaft will not feed down, but will simply revolve in a horizontal plane, in which case the

cutter will ream and smooth the bore, forming a smooth surface at the shoulder or enlargement inside to prevent the spokes from striking the box.

The groove *q* is of service not only to prevent the nut from being drawn out of the socket C, but also especially in truing the wheel preparatory to boring. In such case the apparatus, with the wheel mounted, is placed horizontally, and the whole is revolved upon the nut I as a pivot. The end of the screw *p* fitting within the groove *q*, prevents the apparatus from running off the nut, and also holds it in an exact position as it is revolved, so that the rim of the wheel will run in an exact plane in truing. A tram may also be used, in truing the wheel, having an arm with a pin which fits to the rim, and will fit all points when the wheel is properly centered.

I employ in boring hubs three different screw-shafts, D, having different-sized cutters. The first is for cutting the center hole from end to end. The second is for making the enlargement in the interior of the hub. The third is for making the shoulder at the end of the hub to receive the flange of the box. They are also adapted to light or heavy work. The nuts I, however, are all of the same size to fit the socket C, hence the change from one to another is made without trouble.

K, Fig. 5, is a tester for truing the machine to the hub, and for centering the latter. It is an obtuse-angled arm or elbow, attached in the cutter-socket of the screw-shaft, and projecting down around the end of the hub. The screw-shaft is secured to the nut so as not to feed down, as before described, and the tester is then swung around the circle, and when all points touch the hub the latter is properly centered. The angle or bevel of the tester is essential to adapt it to different-sized hubs. The screw-shaft is simply turned up or down to make the incline fit the different sizes. The groove *q*, before described, is also essential in this connection, to prevent the tester from wabbling as it is turned, as great accuracy is required.

Having thus described my invention, what I claim as new is—

1. In a hub-boring machine, the two rings E G, the packing-ring H, the gages *l l*, the adjusting-screws *i m*, and the packings *k k*, combined to operate as and for the purpose specified.

2. In a hub-boring machine, the combination, with the screw-shaft D and the socket C, connected with the ring E by supporting-arms *a a*, of the nut I, provided with a head, *n*, resting on top of the said socket, and a circumferential groove, *q*, for the reception of the screw *p*, as shown and described, and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EZRA CASWELL.

Witnesses:
R. F. OSGOOD,
EDWIN SCOTT.