N. Harper,

Gage Lathe.

No. 46,352. Patented Feb. 14, 1865.

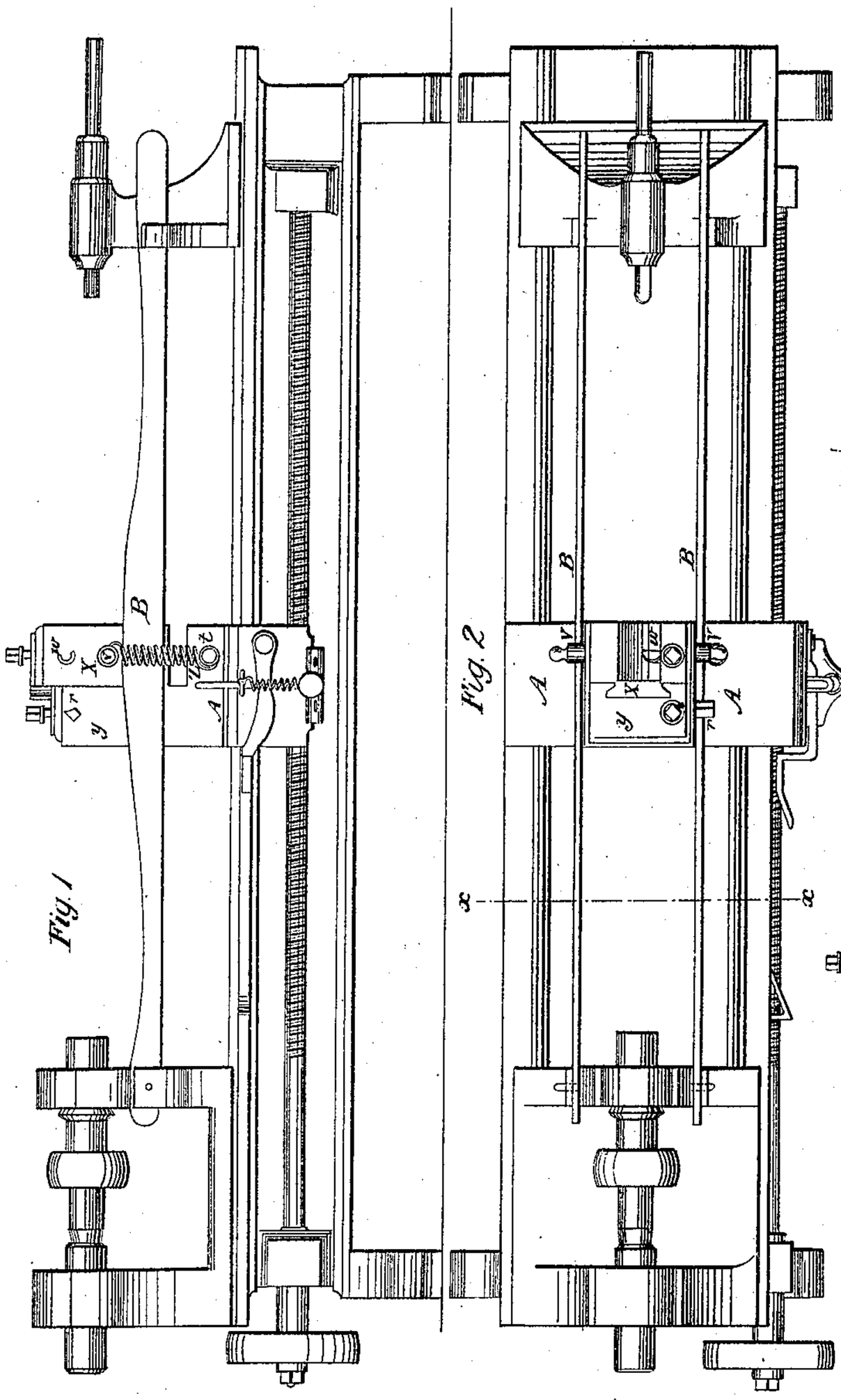

Fig. 1

Fig. 2

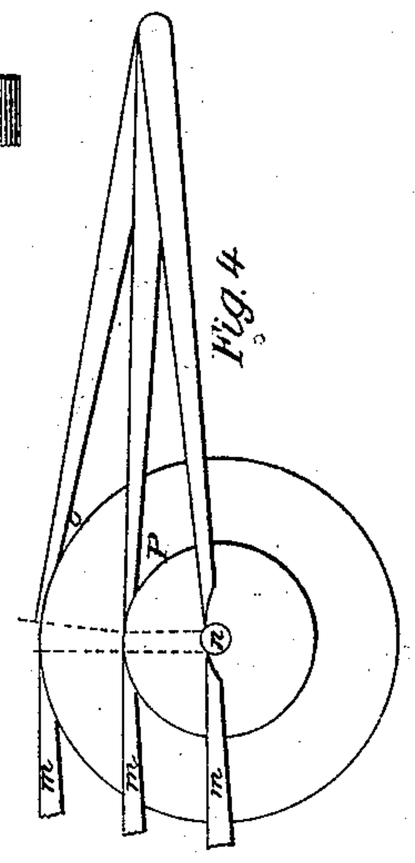

Fig. 4

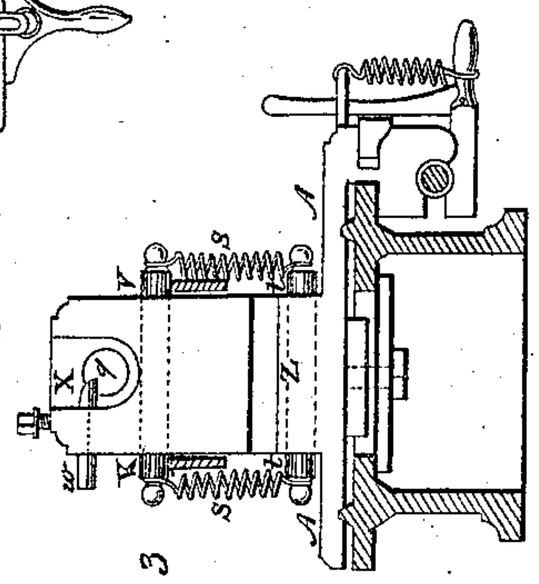

Fig. 3

Witnesses
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UNITED STATES PATENT OFFICE.

NATHAN HARPER, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN TURNING-LATHES.

Specification forming part of Letters Patent No. **46,352**, dated February 14, 1865.

To all whom it may concern:

Be it known that I, NATHAN HARPER, of the city of Newark, in the county of Essex and State of New Jersey, have made certain Improvements in Shaping-Lathes; and I do hereby declare the following to be a full and exact description of the same, reference being herein had to the drawings that accompany this specification and make part of the same.

The nature of my improvement consists in a new arrangement, and in a peculiar construction by which is attained a degree of perfection in workmanship never before reached by any lathe of the kind now in use.

Figure 1 is a side view of a lathe embodying my invention. Fig. 2 is a plan of the same, and Fig. 3 is a transverse section in the line *x x*. Fig. 4 is a diagram.

The same letters refer to the same parts in each figure.

The tool-post *z* on the sliding rest A is constructed in parts *y* and *x*, the parts being held together by a groove and tongue, or in any other manner that will secure freedom of motion to the part *x*, while it holds the tool *w* firm and steady, free from any vibratory motion. The part *y* is fastened immovably to the sliding rest A, the rest having only one movement, which is parallel with the centers of the piece being turned. The part *x* has two movements, one with the sliding rest A and parallel with the center of the thing being turned, the other in a line vertical to the first, or upon any straight line radiating from the center of the piece that is being turned.

Pins *v v* project one on each side of the part *x* and rest on the shaping-bars or patterns B, and are held down thereon by the springs *s s*, the lower end of the springs being fast to the pins *t t*, that are fixed on the part *z* of the tool-post.

One cutting-tool *r* is set in the part *y*, reducing the rough piece to an exact fit in the hole *q*—that is, through the upper part of *y*, as shown at Fig. 3, by which the piece being operated upon is held steady close to the tool *w*, keeping the same distance therefrom the whole length of the turning piece. The tool *r* may operate at the top or any other part of the hole *q*. The distance of the cutting part of the said tool from the axis of the stuff determines the radius to which the latter is cut. If at any time the patterns raise the tool *w* farther from the axis than the tool *r*, the effect is simply to leave that part of the turned piece of the full diameter to which it was reduced by the first tool.

Fig. 3 shows the peculiar shape and the cutting position of the tools *w* and *r*. The shaving is taken mostly endwise of the turning piece, the smooth cut being attained by the end or corner of the cutting gouge projecting and being kept upon the turning piece on the straight line radiating from the center, let its size be large or small, thus causing the last of the shaving to be almost imperceptibly fine, so that the most knotty cross-grained wood can be turned equally smooth with the clearest and straightest, and to a less diameter than ever before could be done by a lathe with such cross-grained material.

In Fig. 4 is an illustration of the principle of moving a tool on a curved vertical line, which prevents the result attained by the tool moving in a straight line radiating from the center. It will be seen that when the turned piece is of the medium size *p*, the tool can rest upon the wood back of the cutting-edge, and so preserve the even thickness of a shaving; but if the turned piece is of the diameter at *o*, then the heel of the tool lifts the edge above a cutting position, and if the piece is reduced to the diameter at *n*, then the tool of necessity digs or scrapes instead of cutting. In Fig. 4 there is also shown the impossibility of even a vertical straight-line movement of a tool being alone a dependence for smooth turning so long as there is any of the feature of the tools resting on the turned piece back of the cutting, for if the tool *m* is shaped to rest on a piece of the diameter of *o*, it cannot fit a piece of the diameter of *n*, and must depend on the rigidity of its holder in toto for the degree of smoothness that may be attained. It is only in the bearing of the tool upon the wood just forward from the cut direct upon the stright line radiating from the center of the turning piece that the uniform cut and polish from the cut can be had in any and every variety of diameters alike, or that can produce the same smoothness upon cross-grained as upon straight-grained material, more from the cut than the friction.

I am aware of lathes having slides carrying cutters moving in a straight line from the center, operated by levers in combination with patterns or a shaping-bar, or by their own gravity in combination with levers and patterns. I am also aware of cutter-slides moving in curved lines operated by springs and shaping bars or patterns. Lathes with slides carrying cutters which all move in the same direction are common. All of such I therefore, of course, disclaim; but

What I do claim, and desire to secure, is—

1. The use of slides carrying cutters having free play in a plane at right angles to the axis of the stuff or thing being cut, in combination with springs and shaping bars.

2. The use of a compound sliding rest consisting of a slide carrying a cutter that moves in a straight line parallel with the center of the thing being cut, in combination with a slide (or slides) carrying a cutter adapted to move in a plane at right angles to the axis of the thing being cut or shaped.

NATHAN HARPER.

Witnesses:

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W. M. GOODING.