(No Model.)

E. HORTON.

MACHINE FOR POLISHING CLOCK PINIONS.

No. 246,313. Patented Aug. 30, 1881.

fig. 1

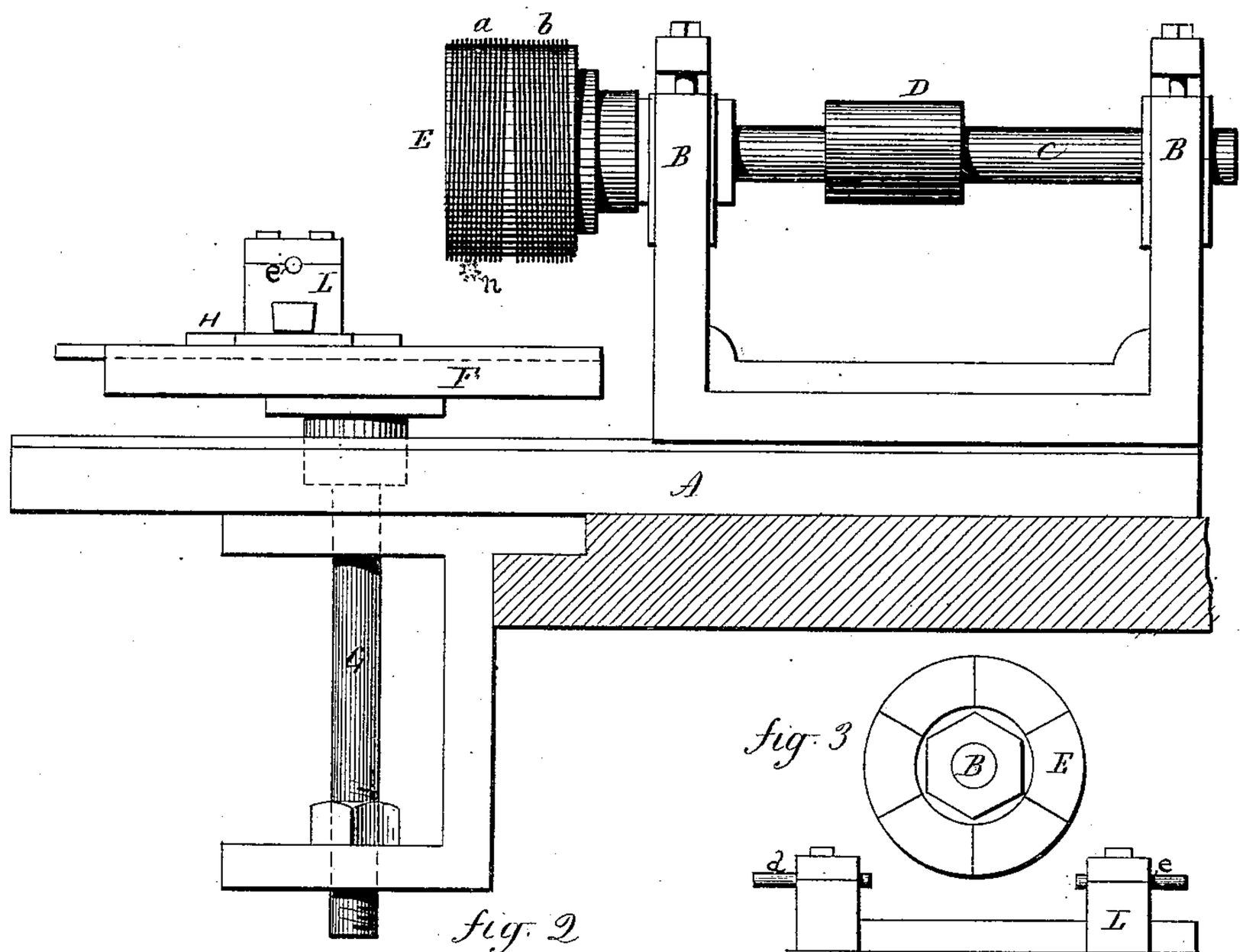


fig. 2

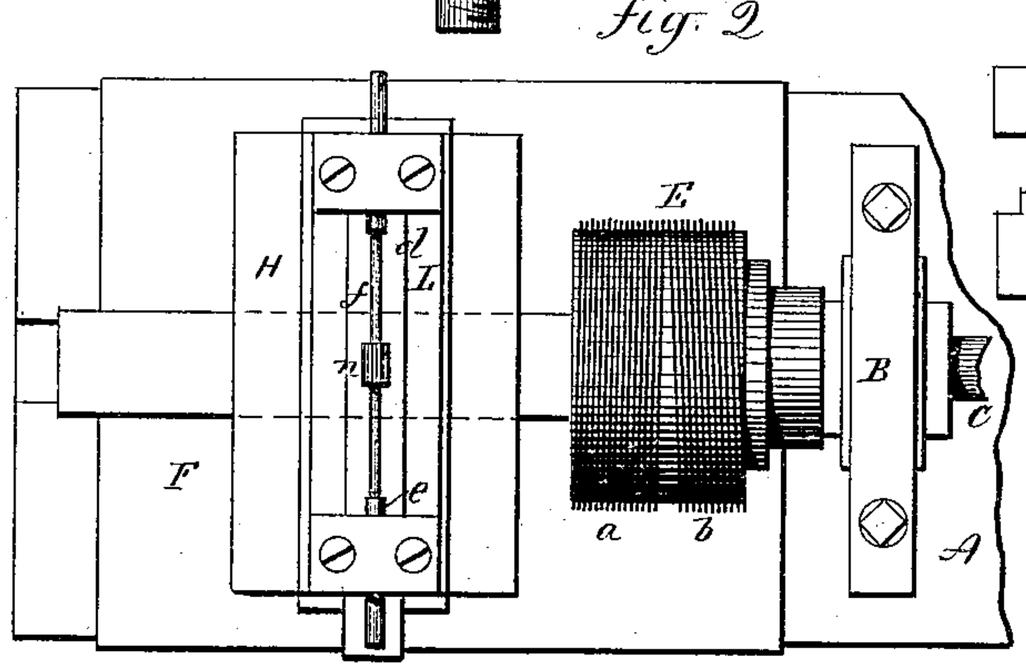
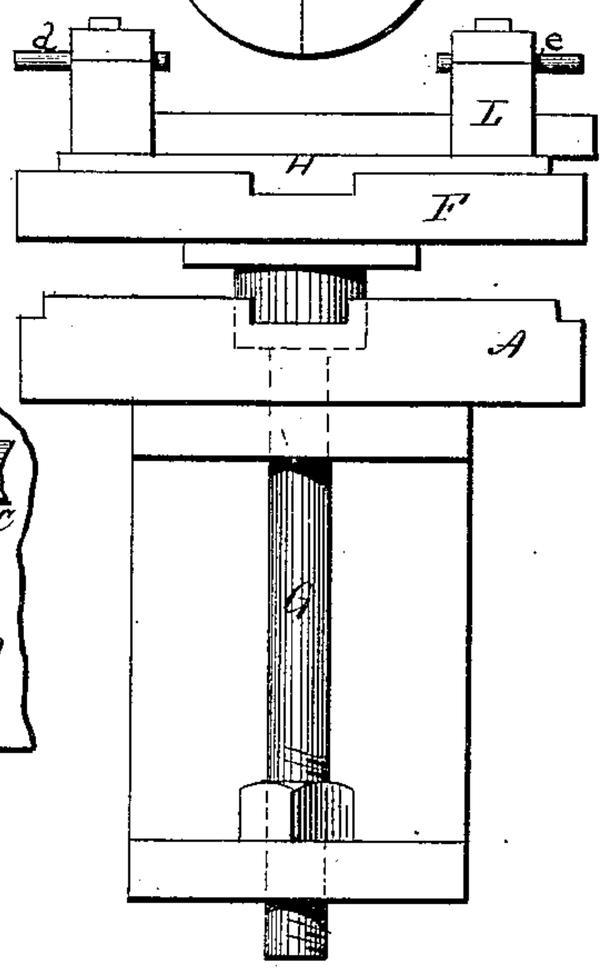


fig. 3



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UNITED STATES PATENT OFFICE.

EVERETT HORTON, OF NEW HAVEN, CONNECTICUT.

MACHINE FOR POLISHING CLOCK-PINIONS.

SPECIFICATION forming part of Letters Patent No. 246,313, dated August 30, 1881.

Application filed July 1, 1881. (No model.)

To all whom it may concern:

Be it known that I, EVERETT HORTON, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machines for Polishing Clock-Pinions; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view; Fig. 2, a partial plan view; Fig. 3, an end view.

This invention relates to an improvement in apparatus for polishing or finishing small pinions, such as employed in clocks, watches, and for similar purposes, and which are usually made from steel, and generally a part of the shaft—that is to say, the shaft and pinion are made from a single piece of wire, the wire cut down each side the pinion to form the shaft, and then the teeth cut in the pinion.

Various devices have been used to polish or finish this class of pinions after the teeth have been cut; but great difficulty has been experienced in all such devices in making a perfect uniformity in the teeth, because such devices have been made to first finish one tooth, then rotate the pinion for the operation upon the next tooth.

The object of my invention is to polish the pinion while it is rotating, and so that the operation comes regular and uniform upon all the teeth and upon both sides of each tooth; and the invention consists in a support for the shaft and pinion, so that it will be free to revolve, combined with a wheel revolving on an axis at right angles to the axis of the pinion, and having in its surface a spiral groove and ribs corresponding to the teeth of the pinion, the surface coated with any suitable polishing material, and the wheel made to revolve rapidly, so that the pinion presented to the surface of the said wheel, with its axis in the relation before described, the spiral grooves and ribs in the wheel will act upon the pinion like a worm-gear, causing it to revolve, and by such revolution present the surface of the teeth to the grooves and ribs of the wheel, to receive therefrom the most perfect finish and polish.

A represents the bed of the machine, on which, in suitable bearings, B, is the shaft C, to which a rapid revolution is imparted by means of a pulley, D.

On the end of the shaft C is the polishing-wheel E, attached to the shaft, so as to revolve with it. In its surface, as represented, there are two series, *a b*, of spiral grooves, one series being left hand and the other right hand, or one the reverse of the other. The wheel is best made from wood, but may be of other material. The coating is made from a preparation of emery, but may be of other known polishing material. The spiral groove forms a spiral rib, the pitch of the said spiral rib being that of the pitch of the pinion to be polished, and so that the spiral rib will work in the teeth of the pinion like a worm-gear.

F is a plate arranged upon a vertical shaft, G, so as to be revolved in a horizontal plane, as occasion may require. On the plate F is a carriage, H, arranged to be moved longitudinally on the plate F as it stands in the drawings; and on this carriage H is a second carriage, L, arranged to be moved on the carriage H at right angles to the movement of the said carriage H on the plate F. The carriage L carries supports *d e* for the ends of the shaft or arbor *f* of the pinion *n*. The supports for the arbor are best made so that one is or both are movable longitudinally in line of the axis of the shaft or arbor, so that either may be drawn outward to permit the insertion of the end of the arbor into the opposite one, and then the movable support set up against the other end of the arbor and held by set-screws; or the bearings may be screws run into the carriage in axial line with the arbor, so as to be adjusted longitudinally, so as to take hold of the ends of the arbor. The inner end of the supports is constructed to correspond with and so as to receive the respective ends of the arbor.

The pinion *n* is arranged in the carriage L, as seen in Fig. 2, its transverse central line being in the plane of the vertical axis of the polishing-wheel E, and so that the carriage H, carrying the carriage L, when moved toward the polishing-wheel, as indicated in broken lines, Fig. 1, will carry the pinion into engagement with the spiral rib and groove of the polishing-wheel, and so that the revolving polishing-

wheel will impart to the pinion a corresponding revolution, in like manner as a worm-gear operates upon its pinion. Because of the polishing material which is applied to the surface of the polishing-wheel, the spiral rib and groove will polish the teeth presented by the constant rotation of the pinion.

By making the surface of the polishing-wheel in two divisions—one right hand and the other left—the pinion, as it is moved beneath or over the surface of the polishing-wheel, will be reversed in its revolution as it passes from the rib of one direction to the rib of the opposite direction. This is advantageous in that it works with greater accuracy upon opposite sides of the teeth—that is, the rib of one direction works upon one side and the rib of the other direction upon the opposite side; but yet, if the rib be only in one direction and fill the space between the teeth of the pinion and the groove fit the edge of the teeth, the best of work will be produced.

The object of making the plate F to rotate is that after having moved the pinion forward over the surface of the polishing-wheel and withdrawn it therefrom the plate F may then be turned one-half around to reverse the pinion, so that it may then be presented from the opposite direction; but this is not essential to the successful operation of the machine, as other devices for supporting the pinion so as to present it the surface of the polishing-wheel may be employed. The carriage which supports the pinion should be moved to the right and left as the pinion passes beneath the polishing-wheel, so as to give the pinion a longitudinal movement, that the whole length of the teeth may be uniformly operated upon.

I claim—

1. The polishing-wheel constructed with a spiral-ribbed surface corresponding to the teeth of the pinion to be polished, one portion of the spiral rib the reverse of another portion—that is to say, one right hand and the other left hand—combined with mechanism, substantially such as described, to hold the pinion and permit it to be presented to the spiral rib of the polishing-wheel, substantially as described.

2. The polishing-wheel constructed with a spiral rib corresponding to the teeth of the pinion to be polished, combined with a carriage constructed to support the pinion and arranged to move in a path parallel with the axis of the polishing-wheel, to present the pinion with its axis at right angles to the axis of the polishing-wheel, substantially as described.

3. The polishing-wheel constructed with a spiral rib corresponding to the teeth of the pinion to be polished, combined with a carriage constructed to support the pinion with its axis at right angles to the axis of the polishing-wheel, and made movable upon a plate arranged to rotate in a plane parallel with the axis of the polishing-wheel, substantially as and for the purpose described.

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Witnesses:
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