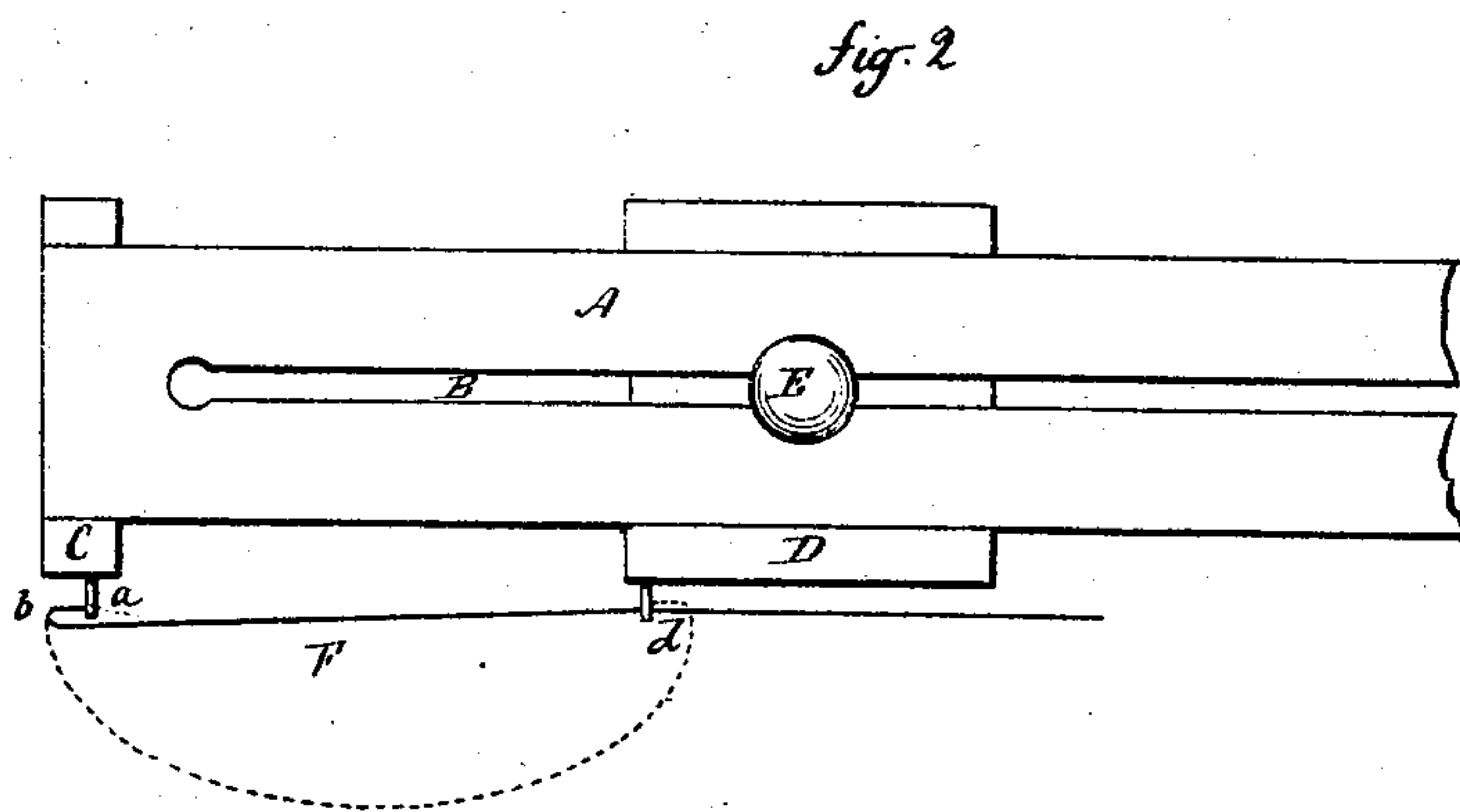
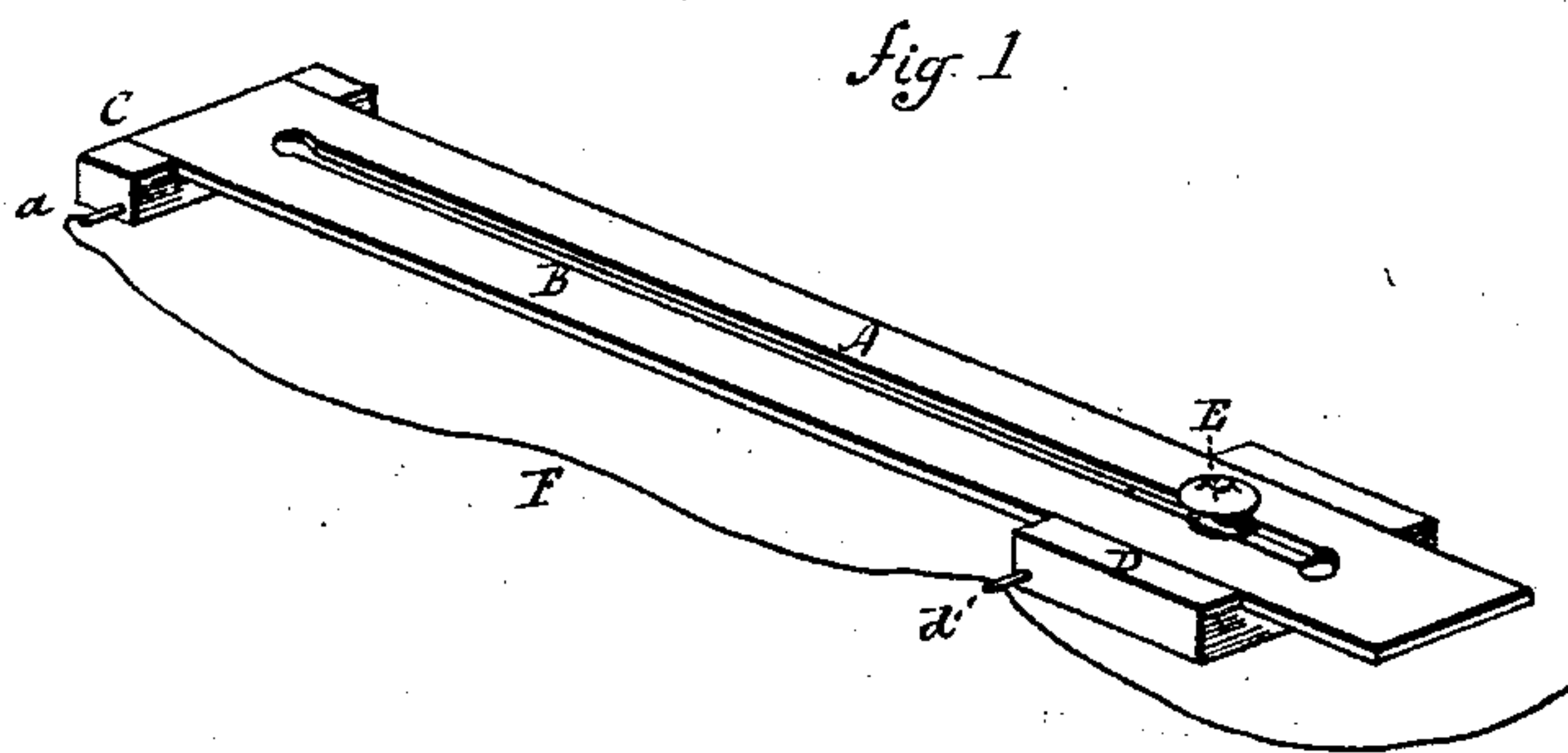


H. A. HAZEN.  
Ellipsographs.

No. 149,474.

Patented April 7, 1874.



Witnesses.  
*J. H. Shumway*  
*A. J. Roberts*

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*John F. Paul*

# UNITED STATES PATENT OFFICE.

HENRY A. HAZEN, OF NEW HAVEN, CONNECTICUT.

## IMPROVEMENT IN ELLIPSOGRAPHS.

Specification forming part of Letters Patent No. **149,474**, dated April 7, 1874; application filed March 13, 1874.

*To all whom it may concern:*

Be it known that I, HENRY A. HAZEN, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Ellipsographs; 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 perspective view, and in Fig. 2, a diagram, illustrating the use of the instrument.

This invention relates to the construction of an instrument to facilitate drawing ellipses, and technically known as "ellipsograph," the object being to produce an instrument so simple in its construction and use as to be adapted to general use for the purpose of drawing ellipses; and in this instrument I make use of the well-known device consisting of a cord, the two extremes of which are fixed at the two focuses of the ellipse, the length of the cord sufficient to extend to the extreme limits of the ellipse, and so as to guide the pencil in its movement; and the invention consists in a bar having one fixed eye, loop, or point, to which the cord is attached, and a second eye, loop, or point, made adjustable on the said bar relative to the first, the said eyes indicating the focuses of the ellipse, and the said cord adjustable as to length, as more fully hereinafter described.

A is the bar, in which is formed a longitudinal slot, B. At one end an eye, loop, or pin, *a*, is fixed, preferably, in a transverse piece, C. D is a slide fitted to the bar, so as to be guided longitudinally and moved freely thereon; E, a

set-screw, by which the slide D may be set at any desired position within the range of the slot B. On the slide D an eye, loop, or point, *d*, is fixed in substantially the same relative position as the eye *a*.

I prefer to make the parts *a d* as eyes similar to needle-eyes; but they may be otherwise formed.

One end of a cord or thread, F, is made fast to one eye, *a*, and its free end passed through the other eye, *d*, and the instrument is ready for use.

Its operation is as follows: The focuses of the ellipse to be described being known, set the two eyes or points *a d* to correspond to the said two focuses; then, the extremes being known, set the pencil in the loop, as at *b*, the instrument lying flat, as in Fig. 2, and draw or slacken the cord until the point *b* corresponds to that extreme of the ellipse; then secure the cord and run the pencil or point from the instrument around against the cord to the opposite point, and one-half the ellipse will be described; then reverse the instrument and describe the other half in like manner.

The instrument is preferably made of wood, is very light, cheap, simple, and easily adjusted, and well adapted for general use for the purpose intended.

I claim as my invention—

The herein-described ellipsograph, consisting of the bar A, fixed point *a*, adjustable point *d*, and adjustable cord F, substantially as specified.

HENRY A. HAZEN.

Witnesses:

A. J. TIBBITS,  
J. H. SHUMWAY.